

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

Vol. 71: No. 5. New York, Thursday, January 29, 1903.

\$5.00 a Year, including Postage
Single Copies, Ten Cents.

Reading Matter Contents.....page 58
Alphabetical Index to Advertisers " 171
Classified List of Advertisers..... " 164
Advertising and Subscription Rates " 77



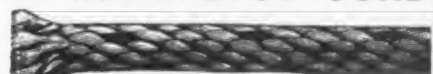
IRON AND STEEL
REPUBLIC IRON & STEEL COMPANY
CHICAGO, ILL.
PRODUCTS

Bristol's Patent Steel Belt Lacing.



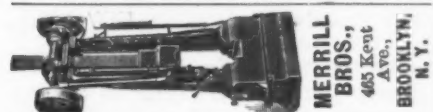
Send for Circulars and Free Samples.
THE BRISTOL CO., Waterbury, Conn.

SAMSON SPOT CORD



SAMSON CORDAGE WORKS, Boston, Mass.

TURNBUCKLES.



FORGINGS.

PILLING & CRANE, Girard Building, Phila.
Lewis Block, Pittsburgh.
Empire Bldg., New York.

APOLLO BEST BLOOM
GALVANIZED IRON

What does anyone gain by
using common galvanized
iron?

Nothing; and loses time
(which is wages) and stand-
ing (which also is money).

American Sheet Steel Company, New York

U.M.C.



**New Inside Lubricated
Smokeless Cartridges.**

To meet a growing demand, the U. M. C. Co. now presents to
the trade these new cartridges loaded with smokeless powder.
They afford all the luxury of smokeless powder and a clean bullet;
yet there is sufficient grease to prevent leading of the rifle barrel.

The Union Metallic Cartridge Co.,
BRIDGEPORT, CONN.

315 Broadway,
New York City.

86-88 First Street,
San Francisco, Cal.

CAHALL BOILERS See Page 120.



CAPEWELL HORSE NAILS

NEW YORK,
PHILADELPHIA,
CHICAGO,
ST. LOUIS,
BOSTON,

Branches:

DETROIT,
CINCINNATI,
SAN FRANCISCO,

PORTLAND, ORE.,
BUFFALO,
BALTIMORE,
NEW ORLEANS,
DENVER.

THE CAPEWELL HORSE NAIL COMPANY
HARTFORD, CONN.



JENKINS BROTHERS' VALVES



Perfectly tight under all pressures of steam, oils, or acids.
Warranted to give satisfaction under the worst conditions.

Received the **Gold Medal** At the Pan-American Exposition.

Insist on having the genuine stamped with Trade-Mark.
JENKINS BROTHERS, New York, Boston, Philadelphia, Chicago.

THE AMERICAN TUBE & STAMPING CO.,

HOT AND COLD ROLLED
STRIP STEEL.

Successor to
The WILMOT & HOBBS MFG. CO.

SEE
PAGE 154.

MAGNOLIA METAL.

Best Anti-Friction Metal for all Machinery Bearings.



Fac-Simile of Bar.
Beware of
Imitations.



MAGNOLIA METAL CO., 113-115 Bank St.,
NEW YORK.
Owners and Sole Manufacturers.

London, Chicago, Montreal, Pittsburgh, Boston
We manufacture all grades of Babbitt Metals
at competitive prices.

THE
ANSONIA BRASS
AND **COPPER CO.**
MANUFACTURERS OF
BRASS AND COPPER
Seamless Tubes, Sheets, Rods and Wire.

SOLE MANUFACTURERS

Tobin Bronze

(TRADE-MARK REGISTERED.)

Condenser Plates, Pump Linings, Round,
Square and Hexagon Bars, for Pump
Piston Rods and Bolt Forgings.
Seamless Tubes for Boilers
and Condensers.

99 John Street, - - New York.

Randolph-Clowes Co.,

Main Office and Mill,
WATERBURY, CONN.

MANUFACTURERS OF

SHEET BRASS & COPPER.
BRAZED BRASS & COPPER
TUBES.

SEAMLESS BRASS
& COPPER TUBES
TO 36 IN. DIAM.

New York Office, 253 Broadway, Postal
Telegraph Bldg., Room 715.
Chicago Office, 602 Fisher Bldg.

WATERBURY BRASS CO.

ESTABLISHED 1845.

Main Office and Mills at Waterbury, Conn.

N. Y. Store, No. 122 to No. 130 Centre St.
Providence Store, No. 131 Dorrance St.
and No. 132 Eddy St.

GERMAN SILVER

IN SHEET, ROD AND WIRE
for

Key Stock
Cutlery Metal
Electrical Purposes
Plated Ware

also

"Pope's Island White Metal"

for like uses when extra drawing
and spinning is required.

WRITE FOR SAMPLES.

GENUINE No. 1 BABBITT.

Handiest Metal you can
use, as there is practically
no shrink in it. Ever tried it?
Saves in every way—Time,
Money and Patience.

GREATEST DURABILITY.

Bridgeport Deoxidized Bronze
and Metal Company,
Bridgeport, Conn.

THE PLUME & ATWOOD MFG. CO.,

MANUFACTURERS OF

Sheet and Roll Brass

—AND—

WIRE

PRINTERS' BRASS, JEWELERS' METAL, GERMAN
SILVER AND GILDING METAL, COPPER RIVETS
AND BURRS.

Plas, Brass Butt Hinges, Jack Chain, Kero-
sene Burners, Lamps, Lamp
Trimmings, &c.

29 MURRAY ST., NEW YORK.

144 HIGH ST., BOSTON.

199 LAKE ST., CHICAGO.

ROLLING MILL:
THOMASTON, CONN.FACTORIES:
WATERBURY, CONN.

SCOVILL MFG. CO.,

Manufacturers of

BRASS, GERMAN SILVER

Sheets, Rolls, Wire,
Rods, Bolts and Tubes,
Brass Shells, Cups, Hinges,
Buttons, Lamp Goods.

SPECIAL BRASS GOODS TO ORDER
Factories, WATERBURY, CONN.

DEPOTS:

NEW YORK, CHICAGO, BOSTON.

JOHN DAVOL & SONS,

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

**COPPER, TIN, SPELTER,
LEAD, ANTIMONY.**

100 John Street, - - New York.

Arthur T. Rutter

SUCCESSOR TO

WILLIAM S. FEARING

256 Broadway, NEW YORK.

Small tubing in Brass, Copper,
Steel, Aluminum, German Silver,
&c. Sheet Brass, Copper and Ger-
man Silver. Copper, Brass and
German Silver Wire. Brazed and
Seamless Brass and Copper Tube.
Copper and Brass Rod.

"Search-Light"

OIL and GAS

Bicycle Lanterns.

Send for Circulars and Electrotype.

THE BRIDGEPORT BRASS CO.,

Bridgeport, Conn.

19 Murray St., N. Y. 17 No. 7th St., Philadelphia.
85 to 87 Pearl St., Boston.

No better counted
made.

4 Wheel, \$3.00

5 Wheel, \$3.25

Guaranteed.

R. A. HART. BATTLE CREEK, MICH

Matthiessen & Hegeler Zinc Co.,

LA SALLE, ILLINOIS.

SMELTERS OF SPELTER

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc cut to order. Rolled Battery Plates.
Selected Plates for Etchers' and Lithographers' use.
Selected Sheets for Paper and Card Makers' use.
Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

BRASS FOUNDERS J. J. RYAN & CO.

88-74 West Monroe St., Chicago.

Best Bronze, Babbitt Metals, Brass and Aluminum CASTINGS

On Short Notice.



BRASS, BRONZE and ALUMINUM CASTINGS.

Founders, Finishers.

W. G. ROWELL & CO., BRIDGEPORT, CONN.

HENDRICKS BROTHERS

PROPRIETORS OF THE

Belleville Copper Rolling Mills,

MANUFACTURERS OF

Braziers' Bolt and Sheathing

COPPER, COPPER WIRE AND RIVETS.

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

THE IRON AGE

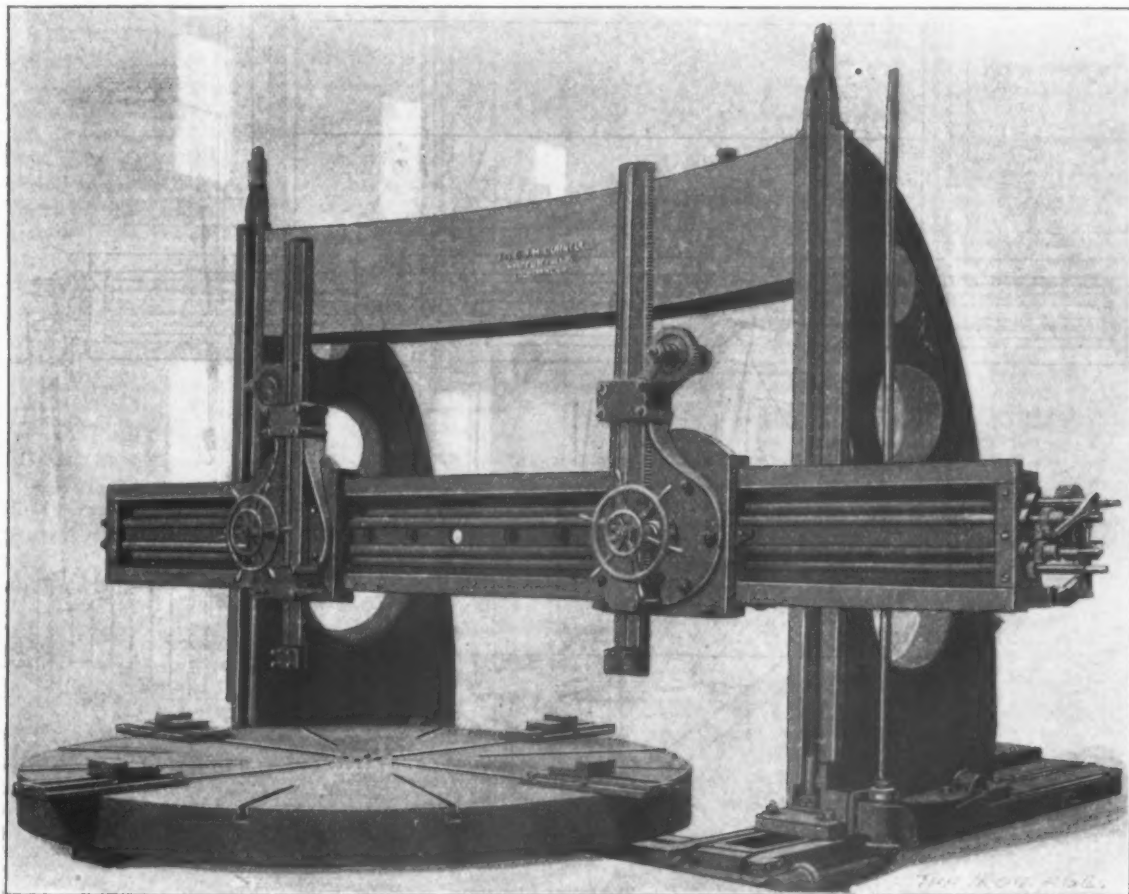
THURSDAY, JANUARY 29, 1903

The Cornell Twenty-four Foot Boring Mill.

The vertical boring and turning mill of the extension bed type, designed and built at the West Point Foundry of J. B. & J. M. Cornell, Twenty-sixth street and Eleventh avenue, New York, is here illustrated in its principal characteristics. With the housings in the forward position it will turn 14 feet in diameter, and with the housings in the back position it will turn 24 feet 6 inches in diameter. The height of work it will take in with the cross rail in the highest position is 9 feet. It will be seen

The two tool heads are independent, can be moved by hand or power on the cross rail and are adjustable to any angle within 45 degrees either side of the vertical.

Another admirable innovation in this class of machine is the method of supporting the housings on rollers when it is necessary to move them along the bed. This is shown in the side elevation, Fig. 4. The rollers A A are mounted on bearings in the bottom of the housing. Each roller is strictly eccentric to its shaft, so that when the levers on the ends of the shafts are turned a quarter



THE CORNELL TWENTY-FOUR FOOT BORING MILL.

from Fig. 1 that the elevating screws for the cross rail extend above the beam, thereby permitting the cross rail to be raised to such a height that the cutting tools will operate on work that will just clear the lower edge of the tie beam. The housings are moved back and forth and the cross rail raised and lowered by power from the main driving belt.

A new and important feature of the machine is the method of counterbalancing the tool bars, which is the invention of J. M. Cornell, the head of the company. This is shown in Fig. 3. On one side of the bar C is cut a rack, with which engages a pinion carried by a shaft mounted in a bracket on the swiveling head. Surrounding this shaft and having one end secured to it is a helical spring, D, the other end of which is made fast to the ratchet wheel E. By means of the pawl and ratchet the tension of the spring can be so adjusted as to exactly overcome the weight of the bar. The arrangement presents a neat and unobtrusive appearance as compared with the usual chain and weight, and has been found to be effective and reliable in its action.

round the housings are carried by the rollers, which are then free to move the entire load along the bed. When the desired position has been reached a reverse movement of the levers brings the housings flat upon the bed. This construction was designed by P. D. Johnston, mechanical engineer of the works.

The feeds of the machine are complete in their arrangement, and positive instead of friction, and range from 0 to $\frac{3}{8}$ inch per revolution of the table. The machine is unusually heavily geared and will take very heavy cuts. The power is derived from a countershaft by belting, or by direct motor, at will.

A canvass of the Homestead and Duquesne mills of the Carnegie Steel Company shows that the men of lower wages have been subscribing freely for the stock offered by the United States Steel Corporation in connection with the profit sharing plan. These men are taking from one to two shares. At Homestead about 25 per cent. of the employed subscribed and at Duquesne from 15 to 20 per cent.

Niagara River Power Questions.

NIAGARA FALLS, N. Y., January 23, 1903.—The commissioners of Queen Victoria Free Park have held a meeting to consider the application of the Toronto-Niagara Power Company for a franchise to develop about 100,000 horse-power in Victoria Park at Canadian Niagara. Quite a little time was devoted to the consideration of the reports of engineers for both sides and also of the experts appointed by the commission. At the conclusion of the meeting it was announced by the president that the matter would be gone over at greater length before a decision was given.

However, it may be stated that there appears reason to believe that the company will get the franchise sought. The Toronto-Niagara Power Company are the

was unable to get any water into its intake at Victoria Park owing to the quantity of ice in the river, as well as to the fact that the water appeared to have been diverted to the outer channel. The city of Niagara Falls, N. Y., was called upon for help, and a line of hose stretched across the upper steel arch bridge and a second line was run across the lower steel arch, connections being made at both ends with hydrants and the pumps in the American municipal station pumping for both sides of the river. This low stage of water has aroused the water commissioners of Niagara Falls, Ont., to the danger of further diversions of the water of the upper river unless special care is taken to see that the water supply of that town is not interfered with. For this reason they have passed a series of resolutions protesting against the granting of any franchise to either

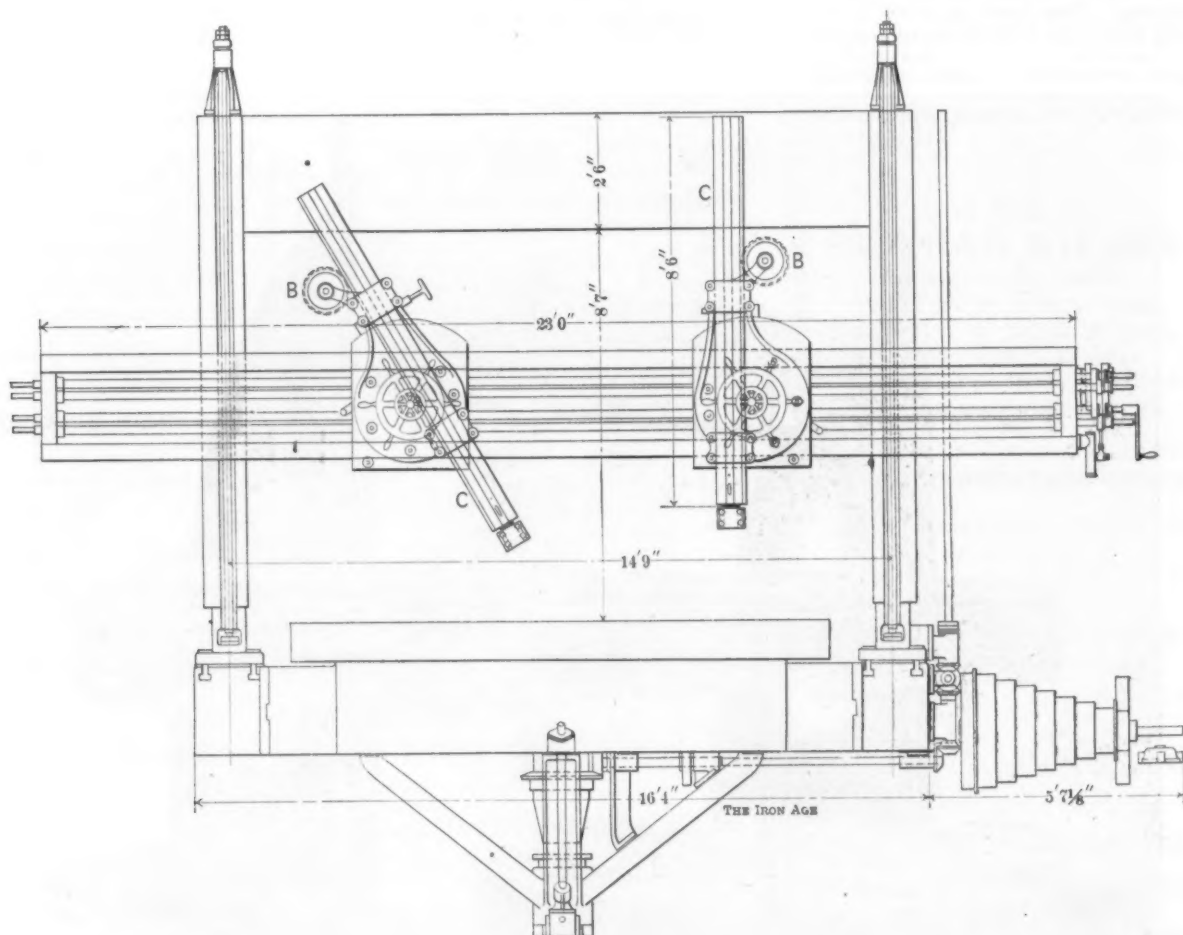


Fig. 2.—Front Elevation.

THE CORNELL TWENTY-FOUR FOOT BORING MILL.

ones that are appealing to pride of country, pointing out that the present great works now in progress of construction at the Falls are backed mainly by American capital and that the development is an American interest. The Toronto-Niagara Company would have all their capital Canadian, and their power developed solely for the advancement of Canadian industries, the other companies having the privilege of transmitting half of their power to the American side of the river if they so desire. Interested in the Toronto-Niagara Company are William Mackenzie, Lieut.-Col. H. M. Pellatt and Frederic Nicholls, and it is understood that their development is contemplated with a special view to the needs of Toronto, Ont. Inasmuch as the other companies now developing power at Canadian Niagara have also in view the transmission of a portion of their power product to Toronto, it seems fair to assume that the industrial necessities of this Canadian city, so far as electric power is concerned, will in time be well cared for.

A short time ago the village of Niagara Falls, Ont.,

the present applicant company or any future company without providing for the protection of the town water works and securing a sufficient supply of water for all municipal purposes. The commissioners further ask that if the granting of a franchise has the effect of impairing the water supply of the town, the company obtaining such franchise shall be compelled to furnish water to the town in lieu thereof.

An Independent Fire Brick Consolidation.—Negotiations are well under way for a consolidation of the principal fire brick concerns outside of the Harbison-Walker Refractories Company of Pittsburgh. The new undertaking will be capitalized at \$15,000,000, and 32 outside fire brick manufacturers have given options on their plants. The largest company that will probably go into the consolidation are the Reese-Hammond Fire Brick Company, with offices in Pittsburgh and works at Bolivar, Pa. Several other Pittsburgh fire brick manufacturers will probably go into the consolidation.

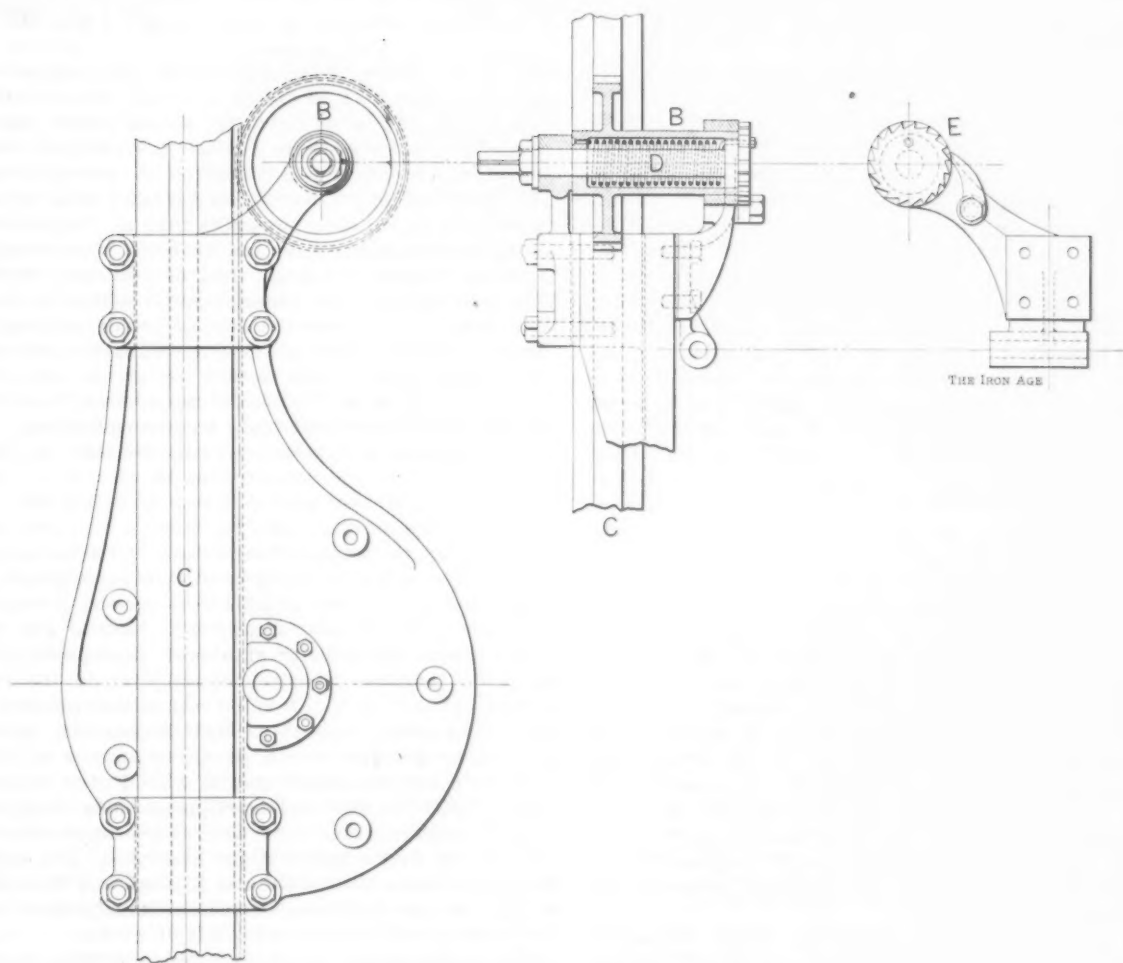


Fig. 3.—Method of Counterbalancing the Tool Bars.

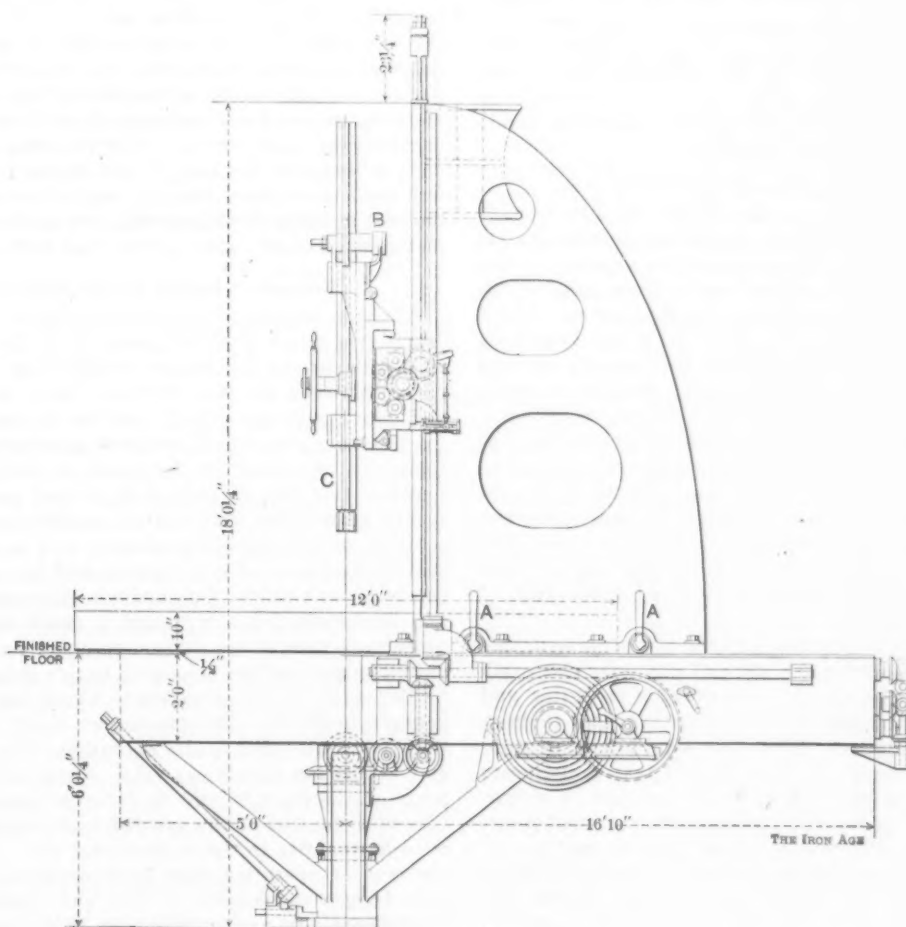


Fig. 4.—Side Elevation.

THE CORNELL TWENTY-FOUR FOOT BORING MILL.

Gas Fuels for Modern Engines.

BY GEORGE E. WALSH.

Advance in Engines of Large Units.

The development of the gas engine in the past year or two has brought to the front the different kinds of gases as important factors in the fuel situation. In this country gas engines have tardily waited upon their development and improvement abroad, but within the year just closed there has been sudden activity shown in connection with them that promises many changes in the near future. The lack of general practical interest in gas engines in this country until quite recently has been due to the fact that experimenters were unable to produce a machine of large unit power which would work continuously under nearly all load conditions. A small unit gas engine was, theoretically, all right, and for laboratory and experimental purposes eminently useful, but in the field of actual labor it did not count.

We have to-day the perfected gas engine of large unit power, and the improvements are rapidly placing the new engines in the competitive list with steam engines. Moreover, the development of the steam turbine has called attention to the possibilities of the gas turbine. This latter, if evolved, might prove the ideal engine for developing power in the future, and the whole field of manufacturing would be revolutionized thereby. The gas turbine, however, is something for the future to demonstrate, and for the present the almost insurmountable difficulties in the way indicate that the machine will remain in the experimental field for some time to come. The confidence expressed by many leading experts that the gas turbine will be realized within the present decade indicates that science will probably overcome all questions involved.

But the steady increase in the use of gas engines of large units brings home to us the possibilities of the gas supply in the United States. The gas engines will, in this country, be grouped somewhat according to the fuel they will consume. Ordinarily this fuel will be understood to possess certain ingredients whose powers of combustion can be estimated by simple calculation. But it should be remembered that gas differs in burning and heating power far more than coal, oil or almost any other well-known fuel. Gas is nothing unless its potential power can be definitely measured.

Engines Operated with Natural Gas.

In classifying the gas engines in this country, according to the fuel they will use, the great Central States, where natural gas is still a determinate factor in the manufacturing interests, will steadily draw chief attention to the engines belonging to the first group. There has been for years a steady decrease in the supply of natural gas throughout the Middle Western States, and the rock pressure has in some places become so insignificant that the gas wells have been entirely abandoned. On the other hand, the invention of new pumping machinery has partly compensated for this lessening pressure, and it has been found possible in some of the old gas regions to secure a full gas supply at little more cost than when it spouted up freely in great quantities. The loss of the gas then was tremendous, but to-day waste is almost entirely eliminated, and every cubic foot of natural gas is utilized.

The chief question involved in the use of gas engines of this group is how much natural gas does the earth contain, and is the supply inexhaustible if better and more powerful pumping engines can be invented to draw it up from the interior? Some scientists assure us positively that the supply is unlimited, and that if engineers can keep pace with the consumption of the gas in inventing new methods of tapping the great underground reservoirs there will never come a time when it will be exhausted. The theory that the supply is constantly being renewed, and that at almost any day the borers may strike a new reservoir which will spout up more natural gas than the world can use in a hundred years, certainly proves very favorable reading to those interested in the subject.

The natural field for the gas engines of this group is

to show their efficiency in pumping up the gas fuel for manufacturing and household uses. Consequently we find in the natural gas regions giant gas engines employed to operate these pumps, and they stand as practical demonstrations of the utility of the modern gas engine. They have come to replace the old coal steam pumps almost entirely. Gas engines of very large units have been erected for burning natural gas, both directly on the field and at great distances from it. The delivery of the natural gas in pipes has in recent years shown a tendency to limit its field. The natural loss through long pipe delivery has caused manufacturers to group their industries as near the field of supply as possible. With the improvement of the gas engine it is believed that in a short time all the natural gas will be used within a radius of 10 or 20 miles of the wells. The saving obtained in this way will prove an important item.

The building of enormous gas compressors to facilitate the efficient and satisfactory delivery of the natural gas to the surrounding towns and factories has been a feature of the operating work, and there is in progress now the construction of some of the largest gas compressors in the world. Two of 4000 horse-power are being built and several of 1000 horse-power. These engines are operated economically with natural gas fuel, which enters the cylinder at almost atmospheric pressure. The engines deliver 1 horse-power in the compressor cylinder on 8 to 9 cubic feet of natural gas per hour. The larger engines of 4000 horse-power accomplish about the same results on a consumption of about 7.50 cubic feet of natural gas of 1050 British thermal units. Under the tests and experiments made everything depends upon the supply of natural gas as to whether this form of engine will continue in service. The engine is easier to operate than one run by coal, and its ability to start up and shut down quickly without loss of any kind recommends it for many kinds of work.

The establishment of more adequate pumping stations and compressors naturally appeals first to engineers interested in the development of gas engines of large units intended for operation by the natural gas fuel. The mammoth pumping engines have already demonstrated the possibility of continuing the use of natural gas for indefinite years in the future. Few indeed of those who own natural gas wells, or manufacturing establishments operated by this fuel, show any doubts about the future certainty of their supply. The impression rather prevails throughout the natural gas region that the supply will tend to increase through better methods of obtaining and utilizing it and through the gradual adoption of methods to eliminate the present loss and waste.

Engines Adapted to Use Poor Gas.

The gas engines of the future must be able to adapt themselves to all kinds of gases, from the richest gases of distillation to the poorest products of the blast furnace. Between the two extremes there are many kinds and qualities of gas which must be successfully utilized by the construction of engines peculiarly adapted to their use. Through the adoption of better mechanical methods this change from rich to poor gas is obtained. It has been found that a little modification of the proportions of the explosive mixture and a proper regulation of the degree of compression and the ignition period obtain these results. Gas engines operated by producer and illuminating gas represent a much wider range of usefulness than those dependent upon natural gas. In our cities gas engines belonging to this group have possibilities scarcely yet measured. From one part of the country to another the gas engine would have its fuel supplied at all times for its operation. The manufacture and distillation of this gas vary considerably in different parts of the country and in different contiguous cities. Likewise the cost of the gas differs so widely when supplied in quantity to the engines that one can figure upon the cost of operation only by ascertaining in advance the charges demanded by the gas companies. The charges for city gas in American cities run all the way from \$0.54 to \$1.35 per 1000 feet; but it will be seen that the difference in the price is not so great when the quality of the fuel is considered. This runs from 100 calories per foot up to 200. In the Southern cities, where the dis-

tillation is chiefly from dry wood, the quality expressed in energy is small, while in the Eastern cities and coal regions, where the distillation is chiefly from coal and schist, the highest energy is obtained. While both extremes of quality are found in different parts of the country, the average gas is placed between 130 and 160 calories.

The cost of producer gas for operating gas engines is further modified by some figures obtained from careful experiments. These figures, it is true, were obtained from tests made with small horse-power motors, but they apply approximately to the larger unit gas engines. The larger the engine operated the greater is the percentage of efficiency and saving of cost of fuel.

Thus a 4 horse-power engine operated by gas costing \$0.54 per 1000 feet would cost per horse-power for each hour of continuous operation about \$0.022, while a 10 horse-power engine would reduce the cost of operation to \$0.019, and a 30 horse-power engine could be run at an average of \$0.017. In considering gas at higher prices, it must be assumed that the quality is in proportion to the increased charges. With gas at \$0.81 per 1000 cubic feet the 4 horse-power engine could be operated at \$0.028, the 10 at \$0.025 and the 30 at \$0.023. With gas at \$1.35 the cost of a 30 horse-power machine would approximately be \$0.035.

With city gas at the highest figure the gas engines could be operated fairly satisfactorily, and even at \$1.10 per 1000 feet the gas engine would prove a successful competitor with any other engine built. Without considering the convenience and other advantages of the gas engine this form of power production on a small scale would prove superior to almost any other, and even with permanent gas engines of large unit power the advantages would be immeasurably great. The portable gas engines in cities are at present the most popular. These average 10 to 20 horse-power, and their efficiency in doing work on the streets, in subways and for building purposes is unequaled.

The consumption of city gas for power purposes is not great in any of our American cities at present, but the steady and increased use and manufacture of the engines show that within even the current year the change will be quite great. In Germany the gas engine has been popular much longer than in this country, and the numerous gas engine shops are crowded with orders. In a great many of the manufacturing German cities the consumption of gas for operating these engines runs as high as 15 and 18 per cent. of the total product. In Paris from 3 to 5 per cent. of the city gas is utilized for the same purpose. There is hardly a city in this country which has 1 per cent. of its gas product utilized for operating gas engines, although the consumption is increasing so rapidly that this statement may not long be true.

The reduction in the cost of gas distillation directly affects the usefulness of the gas engine, and to a considerable extent determines its future. The cost of coke, anthracite and wood must always be an influential factor in this work, but the modern methods of distillation indicate that improvements will radically alter existing conditions in gas manufacture. The present is not a favorable moment for considering such a reduction of cost, but, despite the present upward tendency of both coke and coal, it cannot be questioned that both of these fuels will go down again. Meanwhile, the effort to use them in less quantities to obtain suitable gas has been of inestimable value. The prohibitive price of any staple article always tends to open ways for getting along without it. Substitutes are bound to be discovered, and science gradually shows that what was formerly considered an absolute necessity is after all more or less of a luxury.

Furnace Gas Engines.

The construction of gas engines to burn the gases of blast furnaces probably represents even more important economical changes than those for utilizing either natural gas or producer and illuminating gas. Germany has held undisputed supremacy in the development of this form of engine in the past few years, and we are just beginning to profit by her experiments. Engineers

look to the German operators for their designs and tests with the blast furnace gas engines, but now that they are perfected it will not be long before a complete change will be effected in this country. With our numerous blast furnaces scattered all through the country, it is essential that the installation of engines to utilize the waste gas should be made at once. The gas engine of 1000 horse-power is no longer a dream. It has been steadily developed and improved by the tandem system, so that it can be operated by blast furnace gas of but 27 calories per cubic foot. As a result of this development the blast furnace suddenly assumes an entirely new line of development. It may be that the production of pig iron will in the near future become only of secondary consideration, and the gas for operating engines the chief factor of the works. The blast furnace gases are sufficient to run powerful engines even when discounting half for waste and for heating the air blast of the furnace.

The amount of gas generated by a blast furnace to produce pig iron is so enormous that if collected and utilized for power purposes it would prove revolutionizing in manufacturing industries. Thus to produce in an ordinary well equipped works about 150 tons of pig iron the blast furnace would generate upward of 20,000,000 cubic feet of gas. To harness this enormous amount of waste fuel is the aim of the builders of gas engines. Utilized for generating steam by burning, about 1000 horse-power could be obtained; but if burnt directly in a modern large gas engine the horse-power generated would be several times as much. Eminent engineers estimated that even if half this volume should be wasted or used for heating the air blast of the furnace there would still be sufficient to produce between 3000 and 4000 horse-power. Such an enormous gas generator would thus prove of the greatest value for ordinary manufacturing purposes. Likewise the gases of coke ovens can be utilized in the same way, adding greatly to the importance of the gas engine in its new field.

Unusual Activity in Wheat.

Wheat, which for months has been of minor importance in the commercial movements of the world, has suddenly jumped into prominence, and the Chicago wheat pit is the center of interest. For months wheat has been almost dormant, but during the past two weeks the various leading markets have sympathized closely with each other, reflecting extreme vitality and strength. It is astonishing how quickly "bull" points are developed in the wheat market. At the moment a wet harvest in Argentina is the news having greatest weight and, in conjunction with lighter stocks than usual in Europe, lends coloring and substance to the upward movement, which is further assisted by the reported sale of a large quantity of flour to the Philippines, following in the footsteps of similar large sales to Australia during the preceding week.

Purchases of wheat by a single Chicago operator are estimated to have been fully 20,000,000 bushels in the past two weeks, at advances ranging up to 6 cents per bushel. Individual transactions of 100,000 bushels have not been infrequent, one operator being credited with the purchase of 4,000,000 bushels during a single session of the Board of Trade. Foreign purchasers are said to have been caught napping and have been compelled to pay the higher prices prevailing upon purchases averaging about 500,000 bushels daily for the last ten days, but it is hard to separate wheat from chaff in the speculative circles. As a feature of the world's daily commercial life such movements are interesting, although not of great importance beyond the arena of the boards of trade, unless long sustained.

The Damascus Steel Company.—Through what is believed to be the discovery of the process of the production of Damascus steel, S. R. Dawson of Des Moines, Iowa, the inventor, has interested sufficient capital for the organization of a company to conduct its manufacture. The company will be known as the Damascus

Steel Company and will be incorporated under the laws of New Jersey, with a capital stock of \$2,500,000, of which \$50,000 will be paid at the organization of the company. The officers of the company are to be C. C. Taft, president; A. M. Haggard of Drake University, vice-president; C. M. Pinkerton, secretary; J. B. Burton of Drake University, treasurer, and S. R. Dawson, superintendent. The Board of Directors will be composed of A. U. Chaney, A. H. Todd, M. A. Mills, C. C. Taft, C. M. Pinkerton, S. R. Dawson, N. R. Smith, A. M. Haggard and J. B. Burton, of Des Moines; C. A. Kerr of Chicago, and H. H. Picking of Orange, N. J. The home offices of the company will be at Des Moines, where offices have already been opened at 207 Fifth street. It is the intention to begin the construction of a plant at once.

The British Metal Trades in 1902.

LONDON, January 10, 1903.—The year 1902 proved to be one of distinct unsettlement and anxiety. The home trade grew gradually worse as the months succeeded each other, and the year closed with contracts difficult to obtain and only at highly competitive prices. The home trade was naturally affected by the reaction after the war. The home purchaser since the conclusion of peace has been chary of unnecessary expenditure. Not only has this spirit of caution found vent in the ordinary structural engineering work upon which the metal trades so largely rely, but it has found expression in a marked disinclination to speculate in futures in any of the raw material markets. It is, of course, true that in certain sections of the trade there has been increased activity in making good the ravages of the war. In the home industries we have felt ourselves gradually drifting into a state almost of stagnation.

One difficulty with which the engineer has had to contend during the year has been a shrinkage of prices in finished commodities, coupled with the maintenance of high prices of raw material and fuel, which prices were maintained for entirely extraneous reasons, notably the unexpected American demand. The result of this has been a disinclination on the part of large engineering concerns to buy except from hand to mouth.

Before proceeding to the more general facts of the situation, a few remarks on the state of trade in the various districts of England interested in the metal trades may help to make things clear.

Barrow-in-Furness benefited during the year by the American demand. In Birmingham the war brought a good deal of trade, but had a disturbing effect upon other branches. When the year opened trade was at a low ebb, German and Belgian competition in iron and steel being very keen, and this competition has continued more or less severe throughout the year, while at times it has been accentuated by equally severe competition from Lancashire and the North of England. The result has been that profits were small. In Cleveland trade was in a very unsettled condition, the only satisfactory branch being that of pig iron. In the finished iron and steel trade and the shipping industry business was distinctly dull, shipping especially suffering from a scarcity of orders and trade disputes. Glasgow was more fortunate last year than any other iron and steel or engineering center. In shipbuilding the Clyde builders actually beat the record, reaching 518,270 tons, or 6000 tons in advance of the previous record—namely, that made in 1901. The locomotive engine builders in Glasgow were kept busy. In the steel trade the largest makers have exceeded the previous year's output, some firms melting as much as 1000 tons of raw material a day. This activity is largely due to the exceptional demand from America for manufactured and semimanufactured material. In Sheffield trade during the year was in almost every respect unsatisfactory. Lancashire is identified more with heavy engineering works than with raw material. The textile trades remained depressed throughout the year, and this had an adverse influence upon engineering. The great development of electrical undertakings, chiefly power and traction, but also lighting,

gave employment to many sections of the trade, and in these departments there was quite a pressure of work.

Prices During the Year.

By way of indicating the trend of prices during the year in the leading descriptions of iron and other metals I extract the ruling prices on the first Thursday of each month during 1902, as made up from the *Ironmonger* metal market record:

Date.	Standard copper.	Straits tin.	Foreign lead.	Common Staffordshire G. O. B. iron bars spelter.	at works.
January 2.....	£49	£106	£10½	£16½	£6½
February 6.....	55	111½	11½	17%	6½
March 6.....	54	114½	11½	17%	6%
April 3.....	53½	119½	11½	17%	6½
May 1.....	52½	130½	11½	18	6½
June 5.....	54	133½	11½	18½	6½
July 3.....	53½	126	11½	18½	6½
August 7.....	52½	126½	11½	18½	6½
September 4.....	51½	123	10½	19½	6½
October 2.....	52½	115	10 13-16	19½	6½
November 6.....	52	118½	10½	19½	6½
December 4.....	50½	113½	10 11-16	19½	6½
Highest	57	137½	11½	19½	6½
Lowest	45½	106	10½	16½	6½

I add to the foregoing prices the following of manufactured iron and steel, showing the differences, if any, on January 1, 1902, and December 31, 1902:

	December 31, 1902.	January 1, 1902.
	£ s. d.	£ s. d.
Marked bars, South Staffordshire.....	8 10 0	8 10 0
Steel rails, Middlesbrough.....	5 10 0	5 10 0
Steel rails, West Coast.....	5 10 0	5 10 0
Steel rails, Cardiff.....	5 10 0	5 2 6
Steel angles, Middlesbrough.....	5 15 0	6 2 6
Steel angles, Glasgow.....	5 10 0	5 12 6
Steel plates (ship), Middlesbrough.....	5 10 0	6 5 0
Steel plates (ship), Glasgow.....	5 17 6	6 2 6
Steel plates (boller), Glasgow.....	6 5 0	6 10 0
Tin plates, Bessemer, 1C cokes,	s. d.	s. d.
South Wales.....	11 9 to 12 0	13 0

Pig Iron and the American Demand.

Our production of pig iron for the year under review is calculated to have been about 8,000,000 tons. This compares poorly with the German output of 9,000,000 tons and that of the United States of 17,500,000 tons. Bolling & Lowe, in their annual statement, offer an interesting remark. They say: "When we turn to our reports of 1872-3 it is noteworthy that the stock at Conal's stores, Glasgow, at that time reached 106,919 tons, and the price quoted was 119 shillings, as against 54 shillings 9 pence and a stock of 25,857 tons. Steel rails then stood at £17 per ton." The outstanding feature of the pig iron market during 1902 was the American demand. In 1901 America bought from this country 44,282 tons of pig iron; last year the figures rose to 504,252 tons. It is my firm conviction that there would have been a serious slump in pig iron prices had it not been for the opportune arrival of American orders.

Finished Iron and Steel.

The prices of finished iron and steel during the year have been maintained fairly well, although the trend of the market is distinctly downward. Bolling & Lowe, commenting upon the trade during the year, say: "The feature of the iron and steel trade of 1901-02 has been the heavy shipment of material from Europe to the United States, and to South America and Mexico for United States account. The exports of steel rails, slabs, blooms and billets have run into hundreds of thousands of tons, a striking contrast to the state of things three years or so ago, when the United States was pouring her surplus of these articles, as well as pig iron and ferromanganese, into this country, the Continent of Europe and many of our colonies, besides competing severely with us in the far East."

In the Midlands at the January 1 quarterly meeting there was a reduction of 5 shillings in unmarked bars. The effect was, however, nominal, bringing the association standard into conformity with the actual selling price.

The demand for Bessemer and Siemens steel in Sheffield has been steady, healthy and without rush. There has been a marked slackening, however, in the demand for Sheffield crucible steel.

The Tin Plate Trade.

It cannot be said, as things go, that the tin plate trade during the year was bad. It was distinctly a typical year, experiencing the "ups and downs" which we all associate in our mind with the tin plate trade. From the opening of the year prices of plates steadily advanced, with the result that the proprietors were tempted to restart mills. The result of this was over-production, with the usual slaughter of the market. Notwithstanding this, however, the demand for Welsh tin plates throughout the year was good and employment was better than for some time previously. In January some 393 mills were at work, and that number is still in operation. American competition had affected this branch of the trade in 1901, but did not exist last year. Local steel markets, however, had no monopoly, as large quantities of German bars were imported. In January tin plate bars were quoted at £4 17s. 6d.; they advanced in February to £5 5s., remained at that figure until June, when they were reduced to £5 2s. 6d.; in September they went down to £4 17s. 6d., and in October to £4 15s., their present price. This price is considered satisfactory by the tin plate manufacturers, but the bar makers are not so pleased.

In January tin plate stocks were reduced to a minimum, and makers found themselves for the first time for many a long year in a position to withstand the dictation of buyers. In January Siemens-coke plates were quoted at 12 shillings 9 pence per box. In February they were advanced to 13 shillings 9 pence, in March to 14 shillings 3 pence, continuing so until June, when prices went down 3 pence per box, and there has been a steady decline since. In August plates were quoted at 13 shillings 6 pence, September 13 shillings, October 12 shillings 7½ pence, November and December 12 shillings per box. In November a decision was come to by the masters and men to restrict production to harmonize with demand.

During the year there were a number of labor disputes and at one time the Wages and Disputes Board existing in South Wales was actually imperiled, the representatives of the Steel Smelters' Union withdrawing. However, peace was finally proclaimed and the smelters' delegates returned to the fold. American tin plate manufacturers will observe with interest and some complacency the fact that very few, if any, improvements in machinery were effected in South Wales tin plate mills during the year. The year closed with, on the whole, a steady increase in the demand for tin plates.

Galvanized Sheets.

The feature of the trade last year was the great spurt in galvanized sheets. The causes of this were, however, not permanent, but transitory. Large demands were made for galvanized sheets immediately after the war in South Africa, on the general principle, I suppose, that galvanized sheets are the quickest way of getting a roof over dismantled dwellings. Then there was a special demand for galvanized sheets for India, and although I do not know this for certain, yet I think the great Delhi Durbar would account for it. One way and another the sale of galvanized sheets went up by over £1,000,000 during the year.

Engineering.

It is impossible in a paragraph to generalize upon the condition of the engineering trades during 1902. My impression is that the end of the year saw the conclusion of many valuable contracts, with considerable doubt as to where new contract were coming from. Certain it is that recent tenders to specifications have been priced on a highly competitive basis, thereby showing a keen desire to obtain fresh business. As I have already stated, the engineers have been seriously handicapped by a marked reduction of prices on contracts, coupled with the maintenance of high prices in raw material and fuel. South Africa has opened up a much needed market for engineering products, and the evidence is found in the increased exports of steam engines, machinery and mill work of all descriptions to

that country. The construction of railways in all parts of the world, particularly India, affords increasing scope for engineering talent. During the year the exports of machinery and mill work, compared with the two previous years, were as follows:

	1900.	1901.	1902.
	£	£	£
Steam engines:			
Locomotives	1,496,849	1,911,340	2,284,094
Agricultural	755,505	620,968	633,971
Other descriptions.....	1,842,987	1,725,627	1,859,648
Total of steam engines..	4,095,341	4,257,935	4,777,713
Not steam engines:			
Agricultural	872,636	732,948	814,831
Sewing machines.....	1,452,000	1,551,981	1,839,373
Mining	561,557	509,249	549,742
Textile	6,214,245	4,725,878	4,509,992
Other descriptions.....	6,424,005	6,034,353	6,260,161
Total of machinery other than steam engines	15,524,443	13,554,409	13,974,099
Total of machinery and mill work.....	19,619,784	17,812,344	18,751,812

Shipbuilding.

The shipbuilding industry finished the year in gloom and despondency. The following summary not only shows the extent of British shipbuilding during the year 1902 as compared with 1901, but also includes colonial and foreign shipbuilding, and so demonstrates the complete extent of the world's shipbuilding:

	1902.		1901.	
	Vessels.	Tons.	Vessels.	Tons.
Scotland	404	567,886	376	554,406
England	937	891,521	876	1,092,760
Ireland	27	159,633	23	151,922
United Kingdom totals...	1,368	1,619,040	1,275	1,799,088
Colonial	86	24,700	72	9,394
Foreign	939	1,054,907	845	954,803
Grand totals.....	2,393	2,698,647	2,192	2,763,285

If we divide the world's shipbuilding into districts it works out as follows:

	Vessels.	Tons.	I. H. P.
The Clyde.....	312	518,270	480,870
The Tyne.....	144	332,705	277,960
United States.....	162	314,894	174,024
Germany	259	272,350	234,096
The Wear.....	67	230,670	159,450
The Tees and Hartlepool.....	74	195,114	111,600

Another interesting analysis is the work done by the leading shipbuilders of the world. On this point the well informed Glasgow *Herald* says:

"Last year first place in the list of shipbuilders was taken by the American Shipbuilding Company, at whose five yards 119,233 tons of shipping were turned out. Harland & Wolff, however, were really first for any single yard, with an aggregate of 92,316 tons; while William Gray & Co., West Hartlepool, were second with 82,262 tons; Russell & Co., Port Glasgow, third, with 58,387 tons; Workman, Clark & Co., Belfast, fourth, with 52,711 tons, and Palmer's Company, Newcastle-on-Tyne, fifth, with 51,292 tons. This year the American company have still more yards in their combine, and they are first with 132,197 tons, the product of seven establishments, and the order of the six leading firms—not yards—is:

	Tons.
The American Company (7 yards).....	132,197
Harland & Wolff, Belfast.....	79,497
Workman, Clark & Co., Belfast.....	75,932
C. S. Swan & Hunter, Newcastle-on-Tyne.....	58,322
Russell & Co., Port Glasgow.....	55,585
Armstrong, Whitworth & Co., Newcastle-on-Tyne.....	52,039

"Taking out the American company, as hardly eligible for a place in such a list, leaves the order the same, with Harland & Wolff at the top and the American company's Loran yard sixth, with 44,400 tons. The honors certainly go to Belfast."

The most interesting feature of the shipbuilding trade last year was the formation of the American combine, followed shortly afterward by the British Government's agreement with the Cunard Company. The British nation for a month or two was pretty badly scared, but by Christmas we had again come to regard ourselves as quite invincible.

The Year's Export Trade.

The total value of metals and articles manufactured therefrom exported during the year 1902 was £42,612,141, an increase on 1901 of £3,278,474, but a decrease compared with 1900 of £2,734,768. The exports of machinery and mill work and new ships I have already alluded to. In noting the increase in the export trade last year it is important to observe that the South African market, to a large extent, accounted for it. If, in addition to the increased exports of metals and allied goods to South Africa, we add the abnormal exports to America, it at once becomes evident that the British market has been upheld by extraneous and fortuitous causes. Our other customers have been chary in buying. The drought in Australia, the unsettlement in China, the drought and famine in India, have all had an adverse influence.

Toward the end of the year the South American markets showed distinct signs of resuscitation, and the latest reports to hand as to crops in the Argentine point to a good time in the immediate future. The drought in Australia is at an end, the Chinese market is more hopeful than it has been for years past, the Indian market, as I have several times urged, is now well worth cultivating, while a number of virgin markets, notably Uganda, Nigeria and Central Africa, will in the near future be taking great quantities of metal products. The year has been a bad one in Europe, particularly in Russia, Germany, Holland and Belgium. Spain has shown continued signs of revival, and it now looks as if she is economically the stronger for the unpleasant surgical operation which deprived her of her colonies.

Future Prospects.

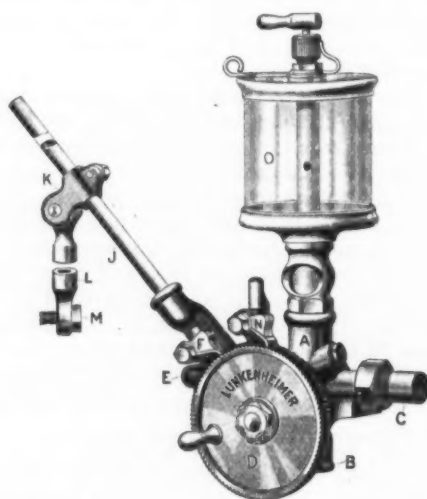
I cannot see a particularly brilliant prospect in the home market for the coming year. It seems, indeed, to be merely a question of fending off trade depression for yet a little longer. It may be that with the improved organization of the trade it will be possible more effectively to control prices, and so to prevent the worst forms of a trade slump. During the last 12 months the order of the day has been toward greater associated efforts, and undoubtedly large concerns feel that the only way out of their difficulties is in the direction of large trusts and combines. The South African market will undoubtedly continue to demand large quantities of material for some months to come, and large merchants tell me that they are not afraid for the first quarter of the year, but the trade generally is in a nervous, anxious frame of mind. In one direction there are signs of distinct improvement—namely, in technical and commercial education. The American scare, while it has not shaken us out of our self confidence, has done good in that it has shown us an inherent weakness in our methods. It is recognized that on the scientific side of business we lag behind both America and Germany. Strong efforts are now being put forth to remedy this defect, and for this we have to thank our American cousins.

S. G. H.

L. H. Lewis, manager of the Manchester Corporation Hydraulic Power Supply, Manchester, England, has devised a plan for utilizing hydraulic power for securing greater pressure on the ordinary water supply when used for extinguishing fires. The plan he proposes is very simple, and consists in fixing under foot paths, at regular distances, 40 hydraulic injector hydrants. These will be marked by an iron door let into the level of the foot path, and connected with the water main and with the hydraulic main. When occasion arises the simple turning of a tap will supply the fireman's hose pipe with a mixture of high pressure water and ordinary water. This mixture, it is stated, will be capable of producing any pressure required in the extinction of fires, even if there be little or no pressure in the ordinary mains, and the hydraulically charged jet, it is added, would be as effective at a height of 100 feet as at a height of 20 feet. Another advantage of this system is that firms who have hydraulic supply on their own premises can, at a trifling cost, have automatic injectors placed inside their buildings, and in case of fire a high pressure water supply could be secured in every room by the simple turning of a tap.

The Lunkenheimer Mechanical Oil Cup.

The Lunkenheimer Company of Cincinnati, Ohio, have designed a positive mechanically operated lubricator, which is here illustrated. The driving mechanism is of the ratchet type and is operated by the clutches F N through the rod J, which can be attached to the eccentric rod or other moving part of the engine by the couplings K M. The motion thus obtained is transmitted to the piston E by a crank. The ratchet wheel is provided with a handle whereby it can be rotated by hand when it is desired to force a quantity of oil at any time, as when starting the engine. By moving the part K up or down the rod the stroke of the pump can be lengthened or shortened, as desired, thus regulating the amount of oil fed by the pump independent of the feed from the oil cup. The joints of the cup are tight, the sight feed glass being packed so as to prevent the access of air that would have a tendency to cause the cup to feed after the engine had ceased running. This construction and the



THE LUNKENHEIMER MECHANICAL OIL CUP.

use of check valves in the pump prevent the oil supply from flooding.

The outlet C is piped to the steam pipe or chest. The bottom of the pump body is tapped with $\frac{1}{2}$ -inch pipe thread to receive a stand so that the device can be placed wherever desired.

The National Fire Proofing Company, a Pennsylvania corporation, have secured a preliminary injunction in the United States Circuit Court at Chicago against the National Fire Proofing Company, an Illinois corporation, restraining them from carrying on the business for which they were chartered and interfering with the business of the Pennsylvania corporation. It is alleged that Hamilton and others undertook to obtain charters in different States for companies having the same name as the plaintiff company and then sell out to them for large sums of money. He is charged with having offered the charters for sale. The National Fire Proofing Company of Pennsylvania claim to have filed their certificates with the Secretary of State of Illinois in compliance with the laws regulating foreign corporations. The plaintiff company allege that if permanent injunctions are not granted great confusion will follow and that their business has already been damaged thousands of dollars by letters and orders being delivered to the wrong corporation. The Pennsylvania corporation are capitalized at \$12,500,000.

The Springfield Boiler & Mfg. Company, Springfield, Ill., have discontinued their branch office in the Marquette Building, Chicago, and are no longer represented in that city by Granville Kimball, their former agent. Hereafter all business formerly pertaining to the Chicago office will be transacted at the main office at Springfield.

Labor Leaders Favor the Senate Eight-Hour Bill.

WASHINGTON, D. C., January 27, 1903.—There has been a complete change of programme on the part of the labor leaders who have been urging the passage of the so-called Eight-Hour bill. As the result of a meeting in this city of the Executive Council of the American Federation of Labor, it has been decided to abandon the House bill and to urge with the utmost vigor the amended measure reported on December 20 from the Senate Committee on Education and Labor.

The difference of opinion existing among the officials of the Federation as to the advisability of pressing the House or Senate bill has heretofore been described in these dispatches. Those officials who, like Mr. Gompers, had been most active in securing the passage through the house of the original Gardner bill, were greatly disappointed at the action of the Senate Committee in modifying the measure in such important particulars as to materially change its character, and they therefore were disposed to insist that the House bill be substituted for the Senate measure. Subordinate labor organizations throughout the country were at once advised to memorialize Congress in favor of the House bill and against the Senate amendments, and petitions to that effect have been reaching both House and Senate in constantly increasing numbers since Congress reassembled after the holiday recess.

The chief objection to the Senate bill, as stated in these memorials, is the fact that under its provisions there is no limit upon a day's work, but only upon the amount of work that can be done by an individual laborer or mechanic upon a Government job. As the purpose of the bill was to limit the hours of labor on any kind of work, that purpose has been completely nullified by the Senate amendments. In spite of the attitude of the leading officials of the Federation, there has always been a respectable minority who have doubted the constitutionality of the House bill, and these officials have insisted that the text of the measure should be submitted by the Executive Council to competent legal authority. This action has been taken, with the result that the council has been advised that the House bill would probably be declared unconstitutional by the courts on substantially the same grounds upon which it was rejected by the Senate committee, as set forth in Chairman McComas' report. Under the circumstances the advocates of the House bill decided to abandon that measure and to join with their colleagues in an effort to pass the Senate bill.

A delegation from the Federation therefore called on Chairman McComas a few days ago and advised him that they were prepared to accept the Senate amendments and desired to urge him to do everything in his power to bring the bill to a vote. He replied that he was gratified to find that the officers of the Federation were willing to accept the Senate bill. With regard to the outlook for the passage of the bill, he told the delegation he had been requested by the Senatorial Steering Committee to indicate the particular measure reported from the Committee on Education and Labor which he desired to have incorporated in the legislative programme, and that he had indicated the Eight-Hour bill. The Steering Committee had given no assurance as to whether the bill would be given the desired position, and it therefore behooved all who were interested in its passage to acquaint the Steering Committee with the fact.

The net result of the deliberations of the Executive Council and of the conference with Senator McComas is that all the pressure that can be commanded by the American Federation of Labor is now being brought to bear upon the Senatorial Steering Committee, and especially upon Chairman Allison, and Senators Aldrich and Hanna, who are regarded as the chairman's chief advisers. It can be stated upon authority that when Chairman McComas nominated the Eight-Hour bill for the place on the legislative programme he was advised by the Steering Committee that while the request would be considered, the advisability of bringing the bill to a

vote was open to grave doubt, owing to the strong opposition to the measure, and especially because of the complicated parliamentary situation now existing in the Senate.

Since Congress convened after the holidays, on January 5, no measures of importance have been considered except the appropriation bills and the so-called Statehood bill. The last named measure was made the "unfinished business" before the adjournment of the first session of the present Congress last July. One reason, at least, why no more strenuous effort has been made on the part of the Senate leaders to devise a method of displacing the Statehood bill is the fact that it is a convenient stop gap to prevent the passage of undesirable legislation at the present period of the session.

This condition of things cannot last indefinitely, however, for the administration is deeply interested in a number of important measures, including the Cuban and Panama treaties and the anti-trust bills, and a way must be found for their consideration if an extra session would be avoided. Whenever the Statehood bill is sidetracked—if it is so disposed of—these other measures will be brought forward with a rush. This will give the opportunity for Chairman McComas to secure consideration for the Eight-Hour bill. He must, of course, contest for position with the friends of these other measures, and upon the Steering Committee will rest the responsibility for giving the bill the right of way. It hardly need be pointed out that those who are opposed to the bill should do everything in their power to convince Senator Allison and his colleagues of the undesirability of its passage.

W. L. C.

The Jones & Laughlin Railroad.

The first practical step toward the building of the new railroad to Lake Erie by the Jones & Laughlin Steel Company of Pittsburgh was taken last week when Congressman John Dalzell introduced a bill in the House of Representatives, Washington, D. C., for the construction of a railroad bridge across the Monongahela River, at Hazelwood, for the Eastern Railroad Company. The latter is merely a local link of the Pittsburgh, Niles & Western. The bill authorizes the Eastern Company to construct a bridge from a point on the north shore of the Monongahela between Hazelwood avenue and the Glenwood Highway Bridge to a point on the south shore in either Baldwin or Lower St. Clair townships. The usual stipulations are made. The plans must first be approved by Secretary of War Elihu Root and the company must make such changes as Secretary Root deems necessary for the best interests of navigation. The bridge must be started within one year after the passage of the act and must be completed within two years after the structure is begun.

The new bridge will be one of the largest, heaviest and finest railroad structures in the Pittsburgh district. It will be sufficiently high to give ample room for all future needs in the way of the navigation of the Monongahela, and will have an unusually long span. It will be a three-track structure, will be built for the heaviest possible traffic and will cost \$1,000,000.

The Eastern Railroad is the Pittsburgh link in the lake line, and it will connect in the yards of the Jones & Laughlin Steel Company with the Monongahela Connecting Railroad. Several charters were procured for the various links. It is expected that the company will push their operations ahead at a lively rate, as it has been practically decided to build the projected lake line. The present freight congestion has shown the inability of the railroads to handle properly the traffic of the district, and the prospect for the future, with heavy extensions to tonnage, is not very bright for those with large plants dependent entirely upon the existing trunk lines.

The Sheet Metal Mfg. Company, Niles, Ohio, manufacturers of stamped ceilings, metal roofing and siding, have just been awarded a contract for the metal ceilings throughout the entire 14 stories of the new Benton Block in New York City. The designs are said to be the handsomest ever submitted for this class of work and it will take one year to complete the contract.

Manganese Ore as a Desulphurizing Agent in Basic Open Hearth Practice.

The late A. Riemer of the Pastuchoff Iron Works, Sulín, South Russia, gives in *Stahl und Eisen* the results of some experiments made by him. His first results are shown in Table I.

After having thus shown the favorable influence of manganese ore, Herr Riemer proceeded to experiment further by melting two similar heats of high sulphur pig without scrap and, in order to be free of the influence of metallic manganese, the percentage of this element was kept as low as possible. The heat with manganese ore took the usual course, while the other needed large additions of spiegeleisen and ferromanganese.

Heat No. 1111.			Table I.		Heat No. 1118.	
			Charges.			
35,040 pounds pig iron (S, 0.06; Mn, 2.35; Si, 0.70; P, 0.21).			35,040 pounds pig iron.		{ Analyses same as in heat No. 1111.	
7,957 pounds crop ends (S, 0.12; Mn, 0.50).			7,665 pounds crop ends.			
1,168 pounds scrap (S, 0.12; Mn, 0.50).			1,168 pounds scrap.			
2,920 pounds limestone.			2,920 pounds limestone.			
6,205 pounds red hematite.			4,745 pounds red hematite.			
			1,460 pounds Nicopol manganese ore (41 per cent. Mn).			
Time.			Progress of Heats.			
H. M.			H. M.		Results of tests, &c.	
Heats charged..... 1 20			1 20			
First slag run..... 5 45			5 05			
Slag test No. 1..... 6 30			5 50		MnO, 19.42; S, 0.42.	
Slag test No. 2..... 9 45			6 30		MnO, 19.42; S, 0.42.	
Second slag run..... 10 00			8 40		MnO, 19.81; S, 0.41.	
Slag test No. 3..... 10 00					Mn, 0.53; S, 0.075; Si, 0.009; P, 0.021; C, 0.24.	
Charge melted..... 10 00					MnO, 15.45; S, 0.48.	
Steel test No. 1..... 10 10					Addition 182 pounds iron ore. Small amount of slag run off.	
Slag test No. 4..... 10 15					Mn, 0.43; S, 0.065; Si, 0.011; P, 0.021; C, 0.11.	
Steel test No. 2..... 10 15					Strong boil.	
Steel test No. 3..... 10 20					Mn, 0.38; S, 0.059; Si, 0.010; P, 0.023; C, 0.07.	
Forge test..... 10 25					36 pounds ferromanganese added.	
Slag test No. 5..... 10 25					Excellent test obtained.	
Slag test No. 5..... 10 25					MnO, 14.75; S, 0.50.	
Slag test No. 6..... 10 30					Addition 146 pounds ferromanganese.	
Slag test No. 6..... 10 35					MnO, 14.60; S, 0.50.	
Tapping out..... 10 40						
Ladle test..... 10 40					Mn, 0.41; S, 0.055; Si, 0.014; P, 0.023; C, 0.07.	

A comparison of the analyses shows at a glance the unmistakable influence of manganese ore. In spite of the addition of 220 pounds of spiegeleisen and of 146 pounds more ferromanganese, Heat No. 1111 without manganese ore shows a worse result than the otherwise identical charge with it. Unfortunately, the amount of iron ore in both heats was so great that they melted down comparatively soft, especially Heat No. 1111, on

The progress of these heats is shown in Table II, but unfortunately the author does not give total length of time taken to complete the heats.

Slag was run off from both heats at various times during melting down. That from Heat No. 209 gave off very obnoxious fumes of sulphur dioxide, while with the other heat this was only the case after additions of ferromanganese or spiegeleisen. In both the slag

Heat No. 209.			Heat No. 212.		
36,500 pounds pig iron (Mn, 0.75; S, 0.27; Si, 1.80).			36,500 pounds pig iron (Mn, 0.75; S, 0.27; Si, 1.80).		
1,824 pounds red hematite.			3,650 pounds red hematite.		
4,380 pounds manganese ore.					
2,372 pounds red hematite.			1,825 pounds red hematite.		
256 pounds ferromanganese (80 per cent. Mn).			548 pounds ferromanganese (80 per cent. Mn).		
Time after melting down.	Results of tests, &c.		Time after melting down.	Results of tests, &c.	
H. M.			H. M.		
1 30	Test No. 1 (Mn, 0.80; S, 0.117; C, 1.62).	All forged well.	1 00	Test No. 1 (Mn, 0.26; S, 0.257; C, 0.96).	Test could not be forged.
1 00	Test No. 2 (Mn, 0.42; S, 0.100; C, 0.31).		1 00	Test No. 2 (Mn, 0.24; S, 0.258; C, 0.88).	
1 30	Test No. 3 (Mn, 0.33; S, 0.100; C, 1.11).		1 30	Test No. 3 (Mn, 0.19; S, 0.253; C, 0.67).	
2 00	Test No. 4 (Mn, 0.33; S, 0.092; C, 0.26).		2 00	Test No. 4 (Mn, 0.17; S, 0.162; C, 0.10).	
2 30	Test No. 5 (Mn, 0.36; S, 0.090; C, 0.21).	Addition of 220 pounds ferromanganese and shortly after tapped.	2 20	Addition of 73 pounds ferromanganese.	Quite red short.
2 30	Test No. 6 (Mn, 0.36; S, 0.088; C, 0.10).		2 20	Test No. 5 (Mn, 0.18; S, 0.190; C, 0.05).	
3 00	Test No. 6 after addition of 36 pounds ferromanganese.		2 30	Addition of 548 pounds spiegeleisen.	
			2 30	Addition of 548 pounds spiegeleisen.	
			2 45	Test No. 6 (Mn, 0.36; S, 0.155; C, 0.11).	Could not be forged.
			2 45	Addition of 73 pounds ferromanganese.	
			2 50	Test No. 7 (Mn, 0.49; S, 0.169; C, 0.07).	
			2 50	Test No. 7 (Mn, 0.49; S, 0.169; C, 0.07).	
			3 00	Addition of 548 pounds spiegeleisen.	Forged well and was not red short.
			3 00	Addition of 548 pounds spiegeleisen.	
			3 10	Test No. 8 (Mn, 0.42; S, 0.145; C, 0.10).	
			3 10	Test No. 9 (Mn, 0.34; S, 0.130; C, 0.07).	
			3 15	Addition of 73 pounds ferromanganese.	Forged well but could not stand red short test.
			3 15	Addition of 73 pounds ferromanganese.	
			3 20	Test No. 10 (Mn, 0.72; S, 0.133; C, 0.12).	
			3 20	Test No. 10 (Mn, 0.72; S, 0.133; C, 0.12).	
			3 20	Addition of 329 pounds ferromanganese.	Tapped out.
			3 20	Addition of 329 pounds ferromanganese.	
			3 20	Addition of 329 pounds ferromanganese.	
			3 20	Addition of 329 pounds ferromanganese.	
			3 20	Tapped out.	Final test: Mn, 0.59; S, 0.125; C, 0.08.
			3 20	Tapped out.	
			3 20	Tapped out.	
			3 20	Tapped out.	
			3 20	Final test: Mn, 0.59; S, 0.125; C, 0.08.	

which account an additional amount of spiegeleisen was necessary. Since manganese ore has a weaker oxidizing effect than iron ore, Heat No. 1118 melted down rather harder than the other and the progress of desulphurization could be observed during completion. The large additions of ore and limestone have manifestly exerted no influence, as may be plainly seen by the analyses of Heat No. 1111. The variations in the percentage of sulphur in the tests of this heat should be noticed. The slag in both cases at the end of the melting down period was thin.

after melting down was very thick. Red hematite added between tests caused each time a cessation of the sulphur fumes.

The first point proved by these heats was on the value of manganese ore as a desulphurizing agent. Another interesting fact, contrary to the views of most open hearth men, was the reduction of manganese from the ore, but this feature must not be overemphasized in view of the small difference in the percentage of this element in the pig and in the molten bath. We can, however, be sure that mangano oxide

in excess protects not only the manganese but also the carbon from oxidation. The idea of the reduction of metallic manganese is not so startling when we consider the extraordinarily large amount of the oxide present in the slag. Sulphur, chiefly removed during the melting down process, is not taken up again, and, in view of the fact that fumes of sulphur dioxide are given off to such an extent as to be a nuisance to those working around the furnace, it may be assumed that it does not remain in the slag. A high percentage of manganeous oxide in the slag, therefore, has the effect of completely removing the sulphur. Furthermore, metallic manganese added to the bath under a covering of slag of this description is particularly effective, as is shown by the remarkably long period during which the latter maintains its pasty condition and the considerable desulphurization (from 0.098 to 0.075 per cent.) which takes place. The history of Heat No. 212 shows plainly that a limey slag, high in ferrous oxide, has little effect on desulphurization, and that if the latter has taken place it is to be ascribed to manganese or carbon. Desulphurization does not take place in the melting down period and first shows itself on the disappearance of the carbon, while at the same time the already low percentage of manganese is decreased still more. By the addition of 1825 pounds of iron ore during the working of the heat the slag became quite thin, showing that it had a large quantity of ferrous oxide in solution, but in spite of this, it could not prevent the sulphur from going back into the metal after the carbon and manganese were almost burnt off. We must therefore correct our views concerning the influence of lime and of slags rich in ferrous oxide to this extent, that although they assist in the work of desulphurization, it is only with the help of manganese and carbon. They do not finally remove the sulphur, but store up the same, and cannot prevent its return to the bath when their allies have disappeared. For this reason, it is only by means of repeated additions of spiegeleisen and ferromanganese that the heat could be so far desulphurized as to give any hope of a satisfactory product. On account of these manipulations, this heat took almost an hour longer than the other, in spite of the fact that the latter melted down considerably harder. This proves that the use of manganese delays the progress of desulphurization at the beginning, but afterward more than makes up for it. We have seen therefore that not only metallic manganese but also slag containing manganeous oxide are excellent desulphurizing agents, as a return of the sulphur into the slag is not to be feared if the latter only contains enough oxide of manganese. Furthermore, the old notion that manganese renders a high percentage of sulphur harmless is proved to be justified by the analyses of Tests No. 10 and the final test of Heat No. 212, which showed a steel fulfilling all the conditions which can be expected in good material.

Mr. Riemer gave as his opinion that many bad heats, the qualities of which have been ascribed to sulphur, owe them to oxygen, and, furthermore, he lays down the following law:

It is possible to produce excellent material in basic open hearth furnace from pig iron containing the highest possible percentage of sulphur.

As proof of this and also as being interesting in itself, he gives the following facts:

He charged a heat as follows:

36,500 pounds pig iron (Mn. 0.45; S. 0.84-0.92; Si. 0.17).
4,562 pounds limestone.
4,745 pounds iron ore.
5,110 pounds manganese ore.

The working of the heat is condensed in Table III, but again Herr Riemer omits to give duration of heat, which would be particularly interesting in this heat.

Table III.

	—Analyses of tests—		
	Mn.	S.	C.
Heat melted down quite soft.....	0.13	0.22	0.04
Addition of 547 pounds pig (4 per cent. Si) and 912 pounds limestone.....	0.19	0.23	0.045
Addition of 912 pounds pig and 182 pounds limestone.			
Addition of 365 pounds spiegel (26 per cent. Mn) and 365 pounds limestone.			

Boil begins.....	0.24	0.185	0.06
Fifteen minutes later.....	0.20	0.192	0.045
Ten minutes later, addition of 912 pounds pig.			
Twenty minutes later.....	0.19	0.208	0.045
Addition of 182 pounds limestone and 365 pounds spiegel.			
Fifteen minutes later, addition 73 pounds ferromanganese.....	0.33	0.185	0.06
(Test would not forge.)			
Addition of 73 pounds ferromanganese.....	0.63	0.163	0.07
(Test forged but was red short.)			
Addition 73 pounds ferromanganese....	0.51	0.172	0.06
(Forge test same as last.)			
Addition 365 pounds spiegel, 365 pounds limestone and 73 pounds ferromanganese.....	0.50	0.155	0.07
(Forge test same as last.)			
Twenty minutes later.....	0.34	0.144	0.05
Addition 912 pounds spiegel and 365 pounds limestone.			
Fifteen minutes later.....	0.38	0.136	0.07
Five minutes later, addition of 73 pounds ferromanganese.....	0.53	0.129	0.07
Addition of 182 pounds ferromanganese and heat tapped out. Ladle test.....	0.56	0.120	0.08

The tensile test gave the ultimate strength as 46,900 pounds, with an elongation of 29 per cent. The material forged, rolled and welded well.

Finally, it may be remarked that by the use of manganese ore there is no difficulty in tapping out heats without using any ferromanganese or spiegeleisen whatever if the amount of ore is correctly measured and the heat properly worked. The charge must be so made up that after melting down the heat can boil thoroughly for about half an hour (more or less, according to the size of the furnace) without any additional ore being necessary. It is a curious fact that the charge at the beginning of the boil is very fluid and red short, but quickly thickens until finally a test shows on fracture but a small amount of grain. That is the right moment to tap out if soft steel is desired. There is no red shortness then present and the heat flows as quietly as if an addition of ferrosilicon had been given. A reduction of the manganese from the slag does not, however, take place during this period of boiling, as is proved by the analysis. It may therefore be assumed that manganeous oxide has a favorable effect on the removal of gas from the bath.

Great Advantages Claimed for Buffalo.

Frank H. Goodyear and Charles W. Goodyear of Buffalo, N. Y., recently entertained a party of visiting financiers at a dinner given at the Buffalo Club. It was estimated that interests valued at over \$500,000,000 were represented in the gathering. Brief after dinner speeches were made. William A. Rogers, who is president of the new Buffalo & Susquehanna Iron Company, spoke of Buffalo's future as an iron and steel center. Mr. Rogers also is senior member of the firm of Rogers, Brown & Co. In the course of his remarks Mr. Rogers assured his hearers that the opportunities for the development of the iron and steel business in the vicinity of Buffalo are limitless. He said that at no other point in the world of which he had any knowledge were there more and better facilities for the economical production of pig iron and steel. He pointed to the fact that fuel and raw material can be assembled there cheaper than at any other point; that the transportation facilities are superb; that within easy reach of the city is a vast, thickly populated, wealthy and progressive territory constituting the best market in the world, and that cheap power is also obtainable. Mr. Rogers said that it was inevitable that Buffalo should become the great steel producing city of the world, and that within a comparatively brief period of time the Niagara Frontier from Stony Point to Niagara Falls would be one great industrial center and that covering all this territory there would be one great, compact city of vast population and unreckonable wealth.

Buffalonians present at the dinner were F. H. Goodyear, C. W. Goodyear, S. M. Clement, Arthur Scranton, J. J. Albright, Edmund Hayes, George R. Teller, W. Caryl Ely, General George S. Field, Major T. W. Symons, William A. Rogers, Dr. Roswell Park and H. H. Gardiner.

The Production of Pig Iron in 1902.

An Output of 17,821,307 Gross Tons.

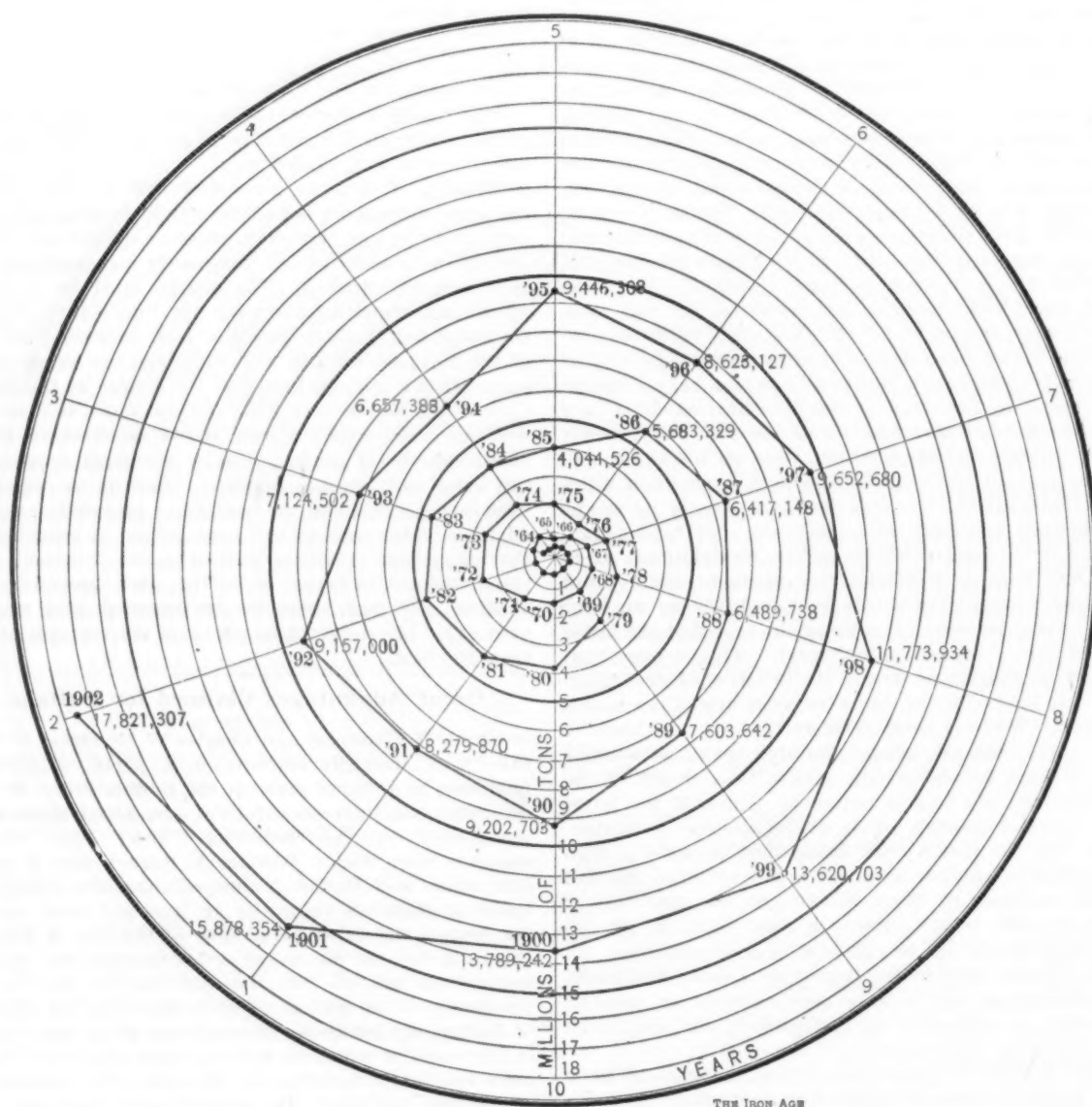
James M. Swank, general manager of the American Iron and Steel Association, has just completed his statement of the production of pig iron in the United States in 1902. The total production of pig iron in 1902 was 17,821,307 gross tons, against 15,878,354 tons in 1901, 13,789,242 tons in 1900, 13,620,703 tons in 1899, and 11,773,934 tons in 1898. The following table gives the half yearly production of pig iron in the last four years, in gross tons:

thracite coal strike also seriously interfered with the activity of many Eastern furnaces.

The total production of iron by States in 1901 was as follows:

Production of Pig Iron by States in 1901 and 1902.

States.	Total for 1901.	First half of 1902.	Second half of 1902.	Total for 1902.
Massachusetts . . .	3,286	1,716	1,644	3,360
Connecticut	8,442	5,278	6,808	12,086
New York	283,662	186,523	214,846	401,369
New Jersey	155,746	105,295	86,085	191,380
Pennsylvania	7,343,257	4,045,965	4,071,835	8,117,800
Maryland	303,186	148,619	154,610	303,229
Virginia	448,662	263,233	273,983	537,216
North Carolina . . . }	27,333	12,401	19,914	32,315
Georgia				
Alabama	1,225,212	700,546	771,665	1,472,211



THE PIG IRON PRODUCTION OF THE UNITED STATES.

Periods.	1899.	1900.	1901.	1902.
First half	6,289,167	7,642,569	7,674,613	8,808,574
Second half	7,331,536	6,146,673	8,203,741	9,012,733
Totals	13,620,703	13,789,242	15,878,354	17,821,307

The increase in production in the second half of 1902 over the first half of 1902 was 204,159 tons. The total increase in 1902 over 1901 was 1,942,953 tons. This is a somewhat smaller increase than the year 1901 showed over the year 1900, which was 2,089,112 tons. Nevertheless it is certainly remarkable that there should have been such a large increase in production in 1902, when there were serious adverse conditions to contend with, chiefly inadequate transportation facilities, resulting in a short supply of coke and iron ore and the banking for longer or shorter periods of many furnaces. The an-

Texas	2,273	1,528	1,567	3,095
West Virginia . . .	166,597	93,297	89,708	183,005
Kentucky	68,462	51,089	59,636	110,725
Tennessee	337,139	187,359	205,419	392,778
Ohio	3,326,425	1,775,496	1,855,892	3,631,388
Illinois	1,596,850	879,800	850,420	1,730,220
Michigan	170,762	85,661	69,552	155,213
Wisconsin	207,551	131,531	142,456	273,987
Minnesota				
Missouri				
Colorado	203,409	133,237	136,693	269,930
Oregon				
Washington				

Totals 15,878,354 8,808,574 9,012,733 17,821,307

The production of pig iron in Pennsylvania and Ohio was distributed as follows:

Production.—Gross Tons of 2240 Pounds (Includes Spiegeleisen).

Districts.	First half of 1902.	Second half of 1902.	Total for 1902.
Pennsylvania:			
Lehigh Valley.....	282,276	235,674	517,950
Schuylkill Valley.....	273,217	247,380	520,597
Upper Susquehanna Valley..	3,147	3,147
Lower Susquehanna Valley...	286,807	240,987	527,794
Juniata Valley.....	82,474	116,097	198,571
Allegheny County.....	2,092,842	2,167,927	4,260,769
Shenandoah Valley.....	606,913	648,020	1,254,933
Miscellaneous bituminous....	415,912	413,897	829,809
Charcoal	2,377	1,853	4,230
Ohio:			
Mahoning Valley.....	764,571	673,516	1,438,087
Hocking Valley.....	20,860	15,334	36,194
Lake counties.....	373,344	487,027	860,371
Miscellaneous bituminous....	449,978	519,394	969,372
Hanging Rock, bituminous...	162,379	154,187	316,566
Hanging Rock, charcoal.....	4,364	6,434	10,798

The production of Bessemer and low phosphorus pig iron in 1902 was 10,393,163 tons, against 9,596,793 tons in 1901. In detail the output was as follows:

Production of Bessemer and Low Phosphorus Pig Iron.

	First half of 1902.	Second half of 1902.	Total for 1902.
New York.....	17,983	48,698	66,681
New Jersey.....			
Pennsylvania:			
Lehigh Valley.....	77,386	38,229	115,615
Schuylkill Valley.....	30,902	23,318	54,220
Upper Susquehanna Valley..	3,147	3,147
Lower Susquehanna Valley...	225,696	178,960	404,656
Juniata Valley.....	1,551,847	1,571,785	3,123,632
Allegheny County.....	434,597	457,179	891,776
Shenango Valley.....	255,864	281,112	536,976
Miscellaneous bituminous....	144,750	152,221	296,971
Maryland	93,297	89,640	182,937
West Virginia.....	2,855	6,891	9,746
Kentucky and Tennessee.....			
Ohio:			
Mahoning Valley.....	561,965	531,277	1,093,242
Lake counties.....	344,117	474,990	819,107
Hanging Rock, bituminous...	52,568	60,035	112,603
Miscellaneous bituminous....	413,559	489,094	902,653
Illinois	752,989	742,309	1,495,298
Michigan, Wisconsin and Min- nesota	38,349	43,979	82,328
Missouri and Colorado.....	104,061	97,519	201,580
Totals.....	5,105,932	5,287,236	10,393,168

The production of basic pig iron in 1902 was 2,038,590 tons, against 1,448,850 tons in 1901 and 1,072,376 tons in 1900. The details were as follows:

Production of Basic Pig Iron, Not Including Charcoal Iron.

	First half 1902.	Second half 1902.	Year 1902.
New York and New Jersey.....	50,994	39,742	90,736
Pennsylvania:			
Allegheny County	443,901	488,631	932,532
Other counties.....	304,633	291,583	596,216
Virginia and Alabama.....	179,974	115,217	295,191
Ohio and Missouri.....	73,772	50,143	123,915
Totals.....	1,053,274	985,316	2,038,590

The production of charcoal pig iron in 1902 was 378,504 tons, against 360,147 tons in 1901 and 339,874 tons in 1900. The production of mixed charcoal and coke pig iron in 1902 was 11,665 tons, against 23,294 tons in 1901 and 44,608 tons in 1900.

The production of spiegeleisen and ferromanganese in 1902 was 212,981 tons, against 291,461 tons in 1901 and 255,977 tons in 1900.

In 1901 this country made more pig iron than Great Britain and Germany combined, and in 1902 we made more than those two countries and Belgium combined.

Unsold Stocks.—The stocks of pig iron which were unsold in the hands of manufacturers or which were under their control at the close of 1902, and were not intended for their own consumption, amounted to 49,951 tons, against 70,647 tons at the close of 1901 and 442,370 tons at the close of 1900. The American Pig Iron Storage Warrant Company held no pig iron whatever in any of their yards on December 31, 1902. This is the first time since their organization in 1889 that the company have not held at least a small quantity of pig iron in their yards at the close of a calendar year. At the end of 1901 they had 3000 tons.

A Diagram of Production.

The accompanying diagram is intended to illustrate how constant and rapid has been our production of pig

iron during the last 60 years. The tonnage is represented in a series of concentric rings, the decades being indicated by heavier lines. The ten radii of the circle represent the years, so that the production of each decade is directly comparable. Thus the radius representing 1902, 1892, &c., furnishes at a glance a measure of the growth for each ten years from 1862 to 1902. A flattening in the spiral, like in the period of 1892 to 1895, indicates a slackening in productive activity.

The Tabor Molding Machine in Great Britain.

A trade circular issued by the English representatives of the Tabor Mfg. Company, Philadelphia, Pa., gives a number of views showing the various operations employed in using this machine, and also prints a long list of foundrymen in Great Britain who are using or have ordered the Tabor machine. These foundrymen have, in some cases, ordered as high as five machines, while quite a number are using from two to four. Those who have used the machines are evidently quite well satisfied with the results achieved, as the list shows that many repeat orders have been received. The list embraces many of the most prominent British manufacturing establishments turning out iron and steel castings.

This publication shows that the standing of the Tabor molding machine in England is much higher than accorded by J. W. Jackman & Co. of London, whose report on the use of molding machines in Great Britain was published in the issue of *The Iron Age* for January 8. The same report stated that the Tabor machine is not so much used in Great Britain as other molding machines, on account of its higher first cost, great complication and smaller adaptability. It would appear from a careful examination of the Tabor machine that it is not a complicated construction, as it covers in its mechanism only four moving parts—namely, the plungers, flask frame and operating valve. These working parts, it may be further stated, have not a single exposed element, but everywhere the working surfaces are absolutely protected from sand and are perfectly lubricated. It would therefore seem that the criticism of Jackman & Co. on this point is not well founded.

As to adaptability, instead of the Tabor machine being defective in this respect, it really appears to be one of its strong features. Manufacturers of hardware who have introduced the machine in their foundries take the patterns from their shelves which have been used for years in hand molding, and without any change use them on the Tabor machine.

The Tabor Mfg. Company further state that large foundries are using thousands of patterns on their machines, using simple split wooden patterns fastened to paraffined wooden pattern plates, and the expense at the outside is 30 cents for a pattern plate and 50 cents for attaching a wooden pattern to it, which makes the operating fitting of the pattern to the Tabor molding machine only 80 cents for ordinary work. Those who have experience in the use of molding machines can make their own comparisons with these figures and draw their own conclusions regarding the adaptability of the Tabor machine. The large number of establishments in Great Britain using the Tabor machines for such a great variety of work would certainly indicate that the machine has met with striking favor among British foundrymen.

Stanley B. Smith & Co., coal operators, of Detroit, Mich., have awarded the Empire Shipbuilding Company of Buffalo a contract for building the first steel lighter ever built in the Queen City. The contract calls for a boat 166 feet long, 34½ feet wide and 10 feet deep, having a carrying capacity of 600 tons of coal. It will be provided with 120 5-ton buckets and will be constructed wholly of steel. It is to be ready for launching on or before April 1 next.

The Carnegie Steel Company have taken over the orders of the Sharon Steel Company, Sharon, Pa., for billets, sheet bars and other materials.

Lake Iron Ore Matters.

Important Leases Closed on the Mesaba Range.

DULUTH, MINN., January 17, 1903.—Two important mining leases have been closed on the Mesaba range the past few days. One of these was referred to a few weeks ago as under negotiation with the J. J. Hill interests, being the southeast one-quarter of the northeast one-quarter of Section 11, and the southwest one-quarter of the northwest one-quarter of Section 12, T 57 R 21. At that time ore had been opened into about half way across the western 40 of this tract, measuring from north to south, but since then it has been found clear to the south line. Then I called attention to the immense width of the ore deposit at this point, it having been "shown nearly 2 miles in width, running from the north side of the Mahoning clear to the center of this 40-acre tract of Section 11." Now this width has been increased by the finding of additional ore to the south line, which emphasizes the remarkable character of this deposit. Mr. Hill pays \$250,000 bonus for a 25-cent lease of this 80-acre tract, buying it for an independent concern not yet announced, but pretty well known. The output is 100,000 tons a year as a minimum. He retains the traffic for his road, turning over the lease. There is a very large deposit on the tract. For the 2 miles of width of ore at this point the average depth is from 200 to 250 feet, making a tonnage that seems almost fabulous. It is interesting to note that but a short time ago the eight forties of this Alworth land in Sections 11 and 12, on which have been found the Agnew of the Deering Company and this new find, were offered to two or three large steel making companies at prices several hundred thousand dollars less than has now been realized by the owners, and were refused by every one of them.

The second deal was the close of a transaction that has been in the option stage for some months, from Duluth parties to the Cleveland Cliffs Company, whereby the latter secure the lease of 160 acres in Sections 31 and 32, T 57 R 22, adjoining the Hawkins mine of the Deering Company. The royalty to be paid the fee holders is 20 cents a ton and an additional 7 cents is to be paid the original lessees in the shape of a bonus for the lease, this additional payment being made as fast as the ore is found. A cash sum was also paid the original lessees by the Cleveland Cliffs Company. So far the tonnage found is not large, but is of a pretty fair grade.

An option was given Friday on the east one-half of the southeast one-quarter Section 24, T 57 R 22, for \$135,000, which is said to have been reoptioned immediately to interests represented by Captain Sellwood for \$175,000. It is a State lease, and some low grade ore has been found thereon by churn drill explorations. The possibilities for a larger find of good ore are encouraging. This township, between the Cleveland Cliffs' new purchase on the southwest corner and this last mentioned option on the east side, has been pretty thoroughly explored by the Donora Mining Company, who had nine drills there all fall, but without favorable result. Some work is now under way in the northwestern part of Section 24, where there is a possibility of good ore.

The Vermillion Range.

On the Vermillion range more exploration is to be carried on this winter and the coming summer than in many years, and if it does not result successfully new work on that range will receive a severe setback. In T 62 R 14, lying between Soudan and Ely mines, the Oliver Iron Mining Company are drilling with two machines in Section 14, and will put on a third. In Section 4, of the same town, they have two shafts on what has been called the Sheridan property, and have taken out some ore of good grade, but the work was abandoned several years ago. Now they propose going back with drills to make a thorough test of the formation. It is generally supposed that ore exists there in some quantity. A drill is in Section 19, same town. In T 63 R 12, where are the Ely mines, drill work is to be carried on in Sections 25 and 26 by the Mahoning Ore & Steel Company and by others.

Just across the township line, in the famous Section

30, the Section 30 Company have let drill contracts to Cole & McDonald, and the first machine is now at work. This is the tract of land that has been in the United States courts for the past 20 years, and of the possible richness of which so much has been said from time to time. The Section 30 Company are said to represent heavy Eastern steel making interests, and the manager, D. Davies, and the secretary, D. E. Woodbridge, are local representatives of these interests. Mr. Davies was until January 1 the manager of the Virginia Iron, Coal & Coke Company and of the Virginia & Southwestern Railway Company, behind whom were the New York firm of Moore & Schley and Henry K. McHarg, president of the Bank of the Manhattan Company. The part of Section 30 included in the lease to the new company is 320 acres, all but one 40-acre tract of which is in the north side of the section, where the iron indications are greatest. Cornering into this tract is an 80 acres owned under lease and in fee by the United States Steel Corporation, through their Bishop Iron Company, and on which there is doubtless a portion of whatever ore lies on the northern half. There will be the most intense interest in what is found on this land on account of the showings and the sensational and costly fights that have been carried on for its possession since 1883.

East of Section 30 and in the same township several drills are working, but so far as known they have not yet found anything of value. In T 61 R 15, a couple of miles north of the mines of the Minnesota Iron Company, at Soudan, Alfred Merritt of Duluth will explore for ore on Pine Island, Vermillion Lake.

The Baraboo Deposit in Wisconsin.

Reference has been made during the past two years to the find of ore near Baraboo, Sauk County, Wis., where Duluth parties had been at work. They now have a shaft 300 feet deep, have drifted 230 feet and have cross cut 60 feet in good ore. Several diamond drills are at work and additional shafts will be sunk. The Illinois Steel Company and the Deering Harvester Company are operating what development work is now under way and are much pleased at the outlook. Rail connections will be made at once, and some ore will be shipped to Chicago this year. La Rue & Whiteside of Duluth were the original explorers and have handled the properties. A town to be called La Rue is now being located, among the incorporators of which are T. W. Robinson, well known from his steel connections.

It has been reported the past few days that the Cleveland Cliffs Company have bought a tract of land at Toledo, Ohio, for steel making purposes. The company have bought this land, about 70 acres, but have no plans for its immediate use. What the future may bring forth is a matter for later consideration, it is stated.

Only a Small Increase Expected in Shipments This Year.

DULUTH, MINN., January 24, 1903.—The general supposition is that but a small increase will be made in ore shipments for 1903. All reports are that ore is being consumed less rapidly than was expected and that the coke situation will check consumption for a long time. Then there may be a delay in the completion of dock and terminal equipment at both ends of the line, while additional rolling stock is liable to be behind in dates of delivery. The Duluth & Iron Range and Duluth, Missabe & Northern roads have 700 50-ton steel cars and several engines coming and fully expect delay. The Great Northern has a lot of cars and locomotives and a new ore dock and the latter is sure to be delayed, while its track for the first of the season will not be up to standard. It is also to add to terminals, but has not begun. The Wisconsin Central's ore dock at Ashland, to replace that burned, will be considerably delayed. Dock improvement at Escanaba will probably be well along by the opening of the season.

Ferdinand Schlesinger's Operations.

Ferdinand Schlesinger, who has been an active operator on the Gogebic range for many years, is now reopening his Palms mine, which has been idle for about 18 months. The Palms was never a large property, though it made a big showing of shipments. It was

operated in its later years for Mr. Schlesinger by L. W. Powell, now holding with great ability the responsible place of assistant to the president of the United States Steel Corporation's mines, and it was operated by him for all it was worth. It has produced 1,110,000 tons, of which 140,000 tons were mined in 1900. It was a very hard mine to handle on account of the vagaries of the ore body, both as to disposition and quality, and required the most exact and constant supervision. Mr. Schlesinger has been exploring at Upson, on the western Gogebic, for two or three years, but has at last quit and this part of the range is practically abandoned. There was at one time great hope of this property and a shaft was sunk several hundred feet. Numerous other explorations that were under way in a more or less cursory way in the neighborhood of Upson and on west to Mellen have all been dropped. Schlesinger interests on the range are in the Newport and Anvil, the latter lying adjoining and east of the Palms.

The Buffalo and Susquehanna Interests.

H. B. Sturtevant, at one time manager of the Pioneer mine, Vermillion range, for the former owners, but of late in the Southwest, is going to the Mesaba to take charge of the Buffalo & Susquehanna Iron Company's properties near Hibbing. These are to be opened at once and are to be considerable shippers the coming season. Mr. Sturtevant will also have charge at the Beaufort mine, Marquette range, that has been bought by the same interest and is to be extensively developed at once. The Beaufort is the only mine in the Michigamme district that is active. The ore is limonite, averaging about 55 to 56 in iron, and is non-Bessemer. It is a large deposit in all probability. Stock piling will be carried on this winter, an innovation for this character of ore, as the extra handling is an addition to the cost, already high for the grade mined. The mine has two two-compartment shafts a mile apart, and two intermediate shafts are now talked of. Considerable new machinery is on the ground and ordered. The royalties on this ore range from 7 to 30 cents, according to grade, giving the operator an assistance where it is very much needed. The ore lies flat, is close to the surface and is continuous between the distant shafts, extending, in fact, for a distance of about 3 miles.

The Cleveland Cliffs Company Actively Exploring.

S. R. Elliot, formerly mining engineer of the Ashland mine for the Cleveland Cliffs Iron Company, goes to the Mesaba range to manage the new Cleveland Cliffs properties there. These are to be explored, developed and opened the coming year in a considerable way. The Cleveland Cliffs Company are looking for more ore bearing lands quite actively and are taking up a number of propositions that give prospect of a favorable result. This company are now among the most energetic explorers on the Mesaba and will doubtless secure much ore, though the cost will probably be many times what it would have been if work had been undertaken a year or more earlier.

The Moose Mountain District in Ontario.

There has been a good deal of exaggeration as to the reported Gates-Sellwood-Osborne ore properties on what is now to be known as the Moose Mountain district in Ontario. This was first referred to in any public way in this correspondence nearly a year ago, when Captain Sellwood's statements, made to the writer, were reported. Since then diamond drilling and sinking has been going on and the amount of ore shown up has been materially increased. But the published statement that there are 180,000,000 tons in sight is laughed at by the owners. One diamond drill boring has shown the ore to possess a thickness of 200 feet at one point and to be without the deleterious elements found in many Canadian ores. The ore is a magnetite running into Bessemer grade and much of it is quite well up in iron. Nothing has been determined as to the operations of mines there, but it is probable that some of the properties may be leased shortly. The owners generally think their holdings are worth at least \$20,000,000, but this is considered

too high for the present, at least by the more experienced mining men among them. It has been stated in some daily papers that Walter Fitch of the Champion mine reported that these properties were the most important since the opening of the Mesaba range. Mr. Fitch would like this corrected, his report actually stating that the surface outcroppings were prominent, probably next in amount of ore so disclosed to the Mesaba. This is quite a different matter, as any one who has seen the surface outcroppings of the Mesaba knows very well. The Moose Mountain deposits are probably to be of the utmost value to the ore trade, and will, dependent on their ultimate ownership, have much to do with the continuance or elimination of the duty on iron ores.

Pickands, Mather & Co., who have been interested in the Sparta and Malta mines on the Mesaba range, have finally taken over their management and have put Robert Murray, who has been their assistant manager of mines for some time, in direct charge. G. A. St. Clair, who has been manager, has other interests which demand his attention and time.

The Lake Superior Iron Company, a United States Steel Corporation interest on the Marquette range, will the coming summer celebrate the fiftieth anniversary of the company and of mining operations at their great works in Ishpeming. The Lake Superior Company have been in business 50 years, have sent to market more than 11,000,000 gross tons of ore and have now a bigger production than ever. They have paid out an immense sum in wages and have educated a host of splendid mining men.

D. E. W.

The Mohawk Valley Steel & Wire Company.

We have the following from our correspondent at Worcester, Mass., under date of January 26:

"The Mohawk Valley Steel & Wire Company, recently incorporated under the laws of Maine with an authorized capital stock of \$25,000,000, have acquired the property of the Cuyahoga Wire Company of Cuyahoga Falls, Ohio. It is understood that several smaller properties have come into the possession of the new company, but the men interested are very reticent about their plans. Samuel H. Colton of Worcester is one of the directors. He was formerly an officer of the Wright & Colton Wire Cloth Company, but sold out his holdings several years ago. He declined to discuss the enterprise, except to admit that the sale of the Cuyahoga property to his company had been assured. It is reported among the independent wire men of Worcester that the Mohawk Company are planning to establish a steel plant and rod mill to furnish wire rods in competition with the United States Steel Corporation. Formal announcement of the company's plans will be made in a week or two, Mr. Colton said."

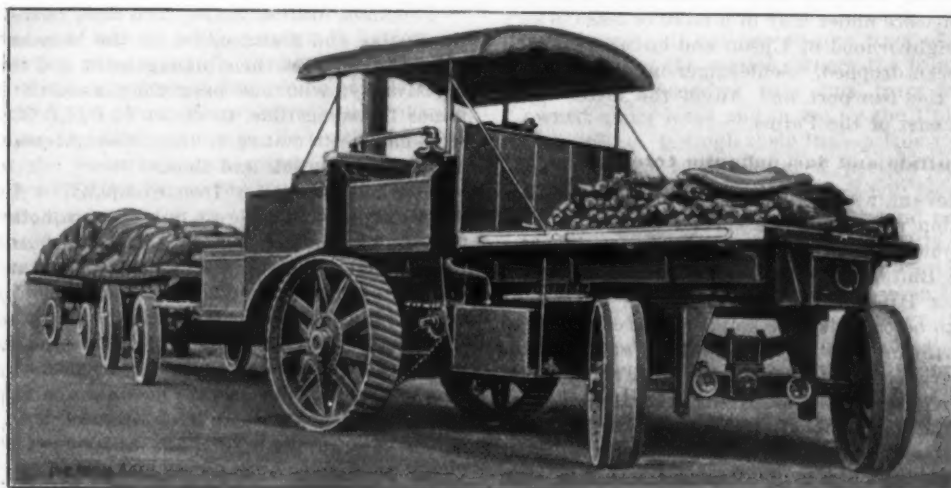
Southern papers report that the company are prospecting in that section for the best inducements to be offered for the location of a steel plant. Brunswick, Ga., claims that the papers have been signed for the location of the plant at that point, over \$300,000 having been raised among the local business interests. But Charleston, S. C., papers publish a letter from Edmund R. Cummings, secretary of the company, under date of January 21, asking what inducements that city has to offer, stating that the corporation will have a paid up capital of \$25,000,000 and a bond issue of \$6,000,000. He says that this company were formed for the purpose of acquiring and creating such other properties as may be necessary to complete a chain of mills and factories handling steel products of all kinds from the ore to the market.

They have already secured four large steel and wire mills situated in the States of Ohio and Pennsylvania, in addition to very valuable ore and coal properties in the South to the extent of 42,000 acres, making them entirely independent from the supply of ore to the shipment of the finished product, and that they contemplate the erection of a rolling mill and open hearth furnace plant, with a finished product of 1600 tons per day. The Charleston Post names Frank A. Umstead as president and general manager.

Five-Ton Steam Wagon for West Africa.

This wagon has been specially built for transporting mining material from the coast at Accra, West Africa, to the various properties of the Goldfields of Eastern Akim, Limited, and subsidiary companies, situated about 70 miles in the interior, which will be reached by means of a road being constructed by the companies interested. During the wet season portions of the route will be exceedingly soft, and the wagon will be required to traverse boggy ground, soft sand, or, at best, rough corduroy roads. For this purpose it is necessary that the power

semiflash type, and is capable of evaporating over 1000 pounds per hour. The fire box is surrounded by tubes, through which the water passes on its way to the generator; it has a fire grate area of 7 square feet, and a depth of 3 feet, thus giving a combustion space of 21 cubic feet. The generator consists of indented tubes laid horizontally above the fire box; these tubes are coupled up outside in such a manner that the joints are never exposed to the flame, and are readily accessible when under steam. The generator tube surface is 120 square feet, the fire box surface is 30 square feet, and the evaporation is 1100 pounds per hour.



Five-Ton Steam Wagon for West Africa.

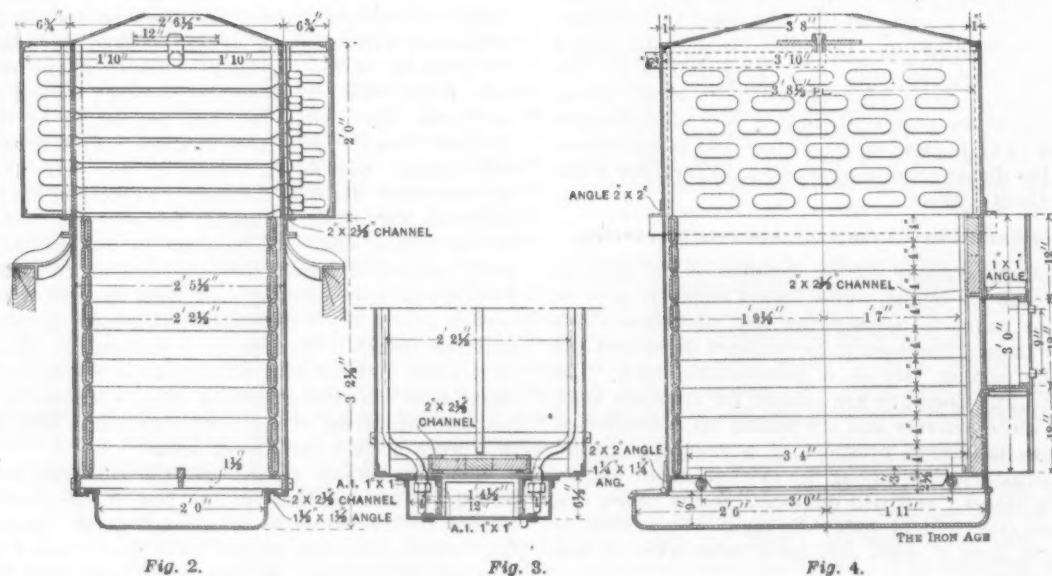


Fig. 2.

Fig. 3.

Fig. 4.

The Boilers.

FIVE-TON STEAM WAGON FOR WEST AFRICA.

should at least equal that of a traction engine, but the weight must be considerably less.

A standard home wagon was, consequently, out of the question, chiefly on account of the power required and its unsuitability for rough ground. As the only fuel obtainable is soft wood of a low calorific value, it was necessary to have a much larger boiler than would otherwise have been the case. Serious limitations were imposed by the difficulty of unshipping at the coast, which fixed the maximum weights and sizes of individual parts. The makers, Simpson & Bibby, Manchester, England, undertook to build a vehicle, Fig. 1, fulfilling the requirements, and to subject the same before shipment to tests under conditions not less severe than those in West Africa.

The boiler, Figs. 2 to 4, is of the positive circulation

The feed is effected by means of two exactly similar steam pumps (one of which is sufficient for normal working) under the immediate control of the driver; a third steam pump, capable of being worked by hand from the firing platform, is also provided for feeding the boiler initially when cold.

The engine is single acting, and consists of four cylinders, Figs. 5, 6 and 7, arranged diagonally, 7 inches in diameter by 5-inch stroke, running normally at 450 revolutions per minute; the arrangement allows of the use of a simple two-throw crank shaft, and gives a turning moment equivalent to that of four cylinders working on independent cranks set at right angles to each other. The two opposite cylinders work on one crank pin through a common bush; the whole surface of the pin is thus available for each cylinder as it comes on to the

working stroke. The regulation of steam to the cylinders is by plain lift valves only, operated by cams on a spindle immediately above and in gear with the crank shaft; advantage is again taken of the diagonal design, one set of cams serving to regulate the admission and exhaust of two opposite cylinders. The cut off is variable for forward motion and constant for reverse; the "linking up" is accomplished by simply sliding the cam spindle

Two speeds are provided, of approximately 6 and 2 miles per hour with the engine running at 450 revolutions per minute. By simply changing the chain pinions speeds of $4\frac{1}{2}$ and $1\frac{1}{2}$ or 3 and 1 miles per hour can also be obtained. On the inside of each road wheel hub is fitted a winding drum which can be uncoupled to work independently of the road wheels. The front axle and steering gear, Figs. 8 to 10, consists of a fore carriage

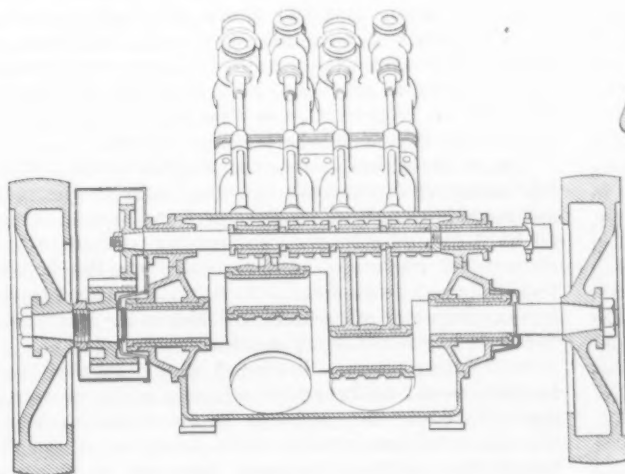


Fig. 5.

Sectional Elevation of Engine.

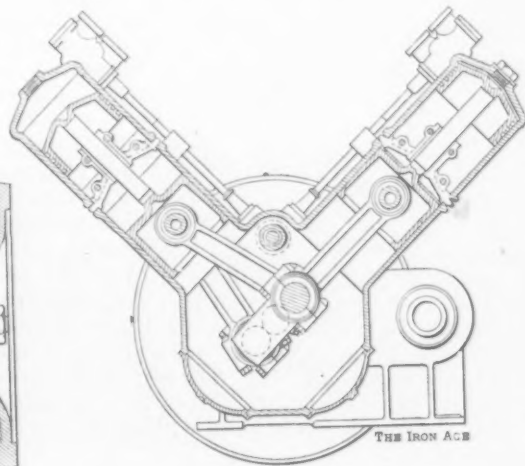


Fig. 6.

axially, thus bringing different cams into operation having contours to give the required regulations.

All the bearings on the crank shaft, crank pins and counter shaft are of the same size and interchangeable, and when under load they are all in constant thrust. The transmission of power from the crank shaft to the road wheels is done in three stages—viz., from the crank shaft

or turntable, the axle being free to oscillate vertically about its center, allowing the vehicle to accommodate itself to undulations of road surface without causing any twisting stresses on the main frame. The steering is accomplished by hydraulic cylinders fixed to the main frame, which pull the turntable round by means of steel cords.

The pressure for steering is supplied by the feed pumps and controlled by a suitable valve, the steering being effected by slight movement of the steering tiller, fixed in front of the driving seat; the water after use in the steering cylinders is returned to the tanks. Three tanks are fitted, two on the platform, each having a capacity of 100 gallons, and one, slung underneath, of 200

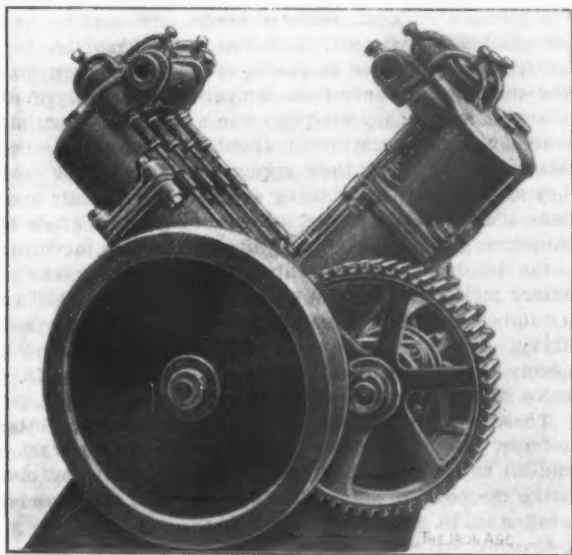
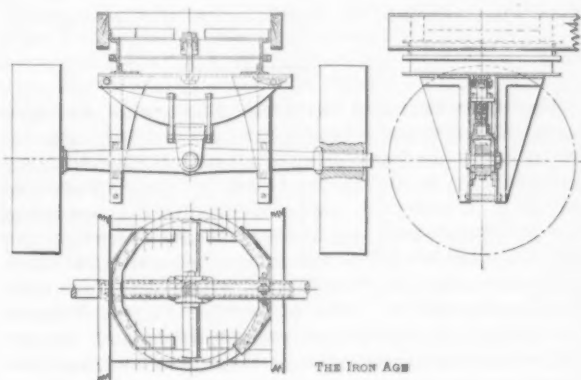


Fig. 7.—View of Engine.



Figs. 8 and 10.

Fig. 9.

Front Axle and Steering Gear.

FIVE-TON STEAM WAGON FOR WEST AFRICA.

to the first counter shaft by cut gearing of bronze and steel—this counter shaft has its bearings fixed firmly in the engine casing to insure alignment; from the first counter shaft to the differential box on the second counter shaft, and from thence to each road wheel by hardened steel roller chains having a breaking stress of not less than 30 tons. The differential gear consists of machine cut spur wheels only, no bevels being anywhere employed.

gallons capacity. The latter tank is filled by means of a steam water lifter and suction, capable of delivering 50 gallons per minute; the two upper tanks are filled from the lower one by a small lifter, and it is from these two tanks that the pumps take their feed. The driving, steering, brakes, feed, &c., are all controlled by the driver, who sits alongside the engine, in sight of the mechanism, and who is protected from the weather by means of a wooden canopy.

The stoking is done from a separate foot plate at the rear by a native, whose sole duty is the feeding of the furnace. Although the ordinary running pressure of the boiler is from 150 to 200 pounds, the engine, transmission, &c., are made sufficiently strong to stand a working pressure of 350 pounds per square inch, when traversing very difficult roads. The wagon has been subjected to most rigorous trials in England before shipment. It has successfully run on a wet grass field; climbing up a steep hill (at a gradient of 1 in 6) the adhesion was insufficient on the wet clay beneath. In a narrow lane, the road surface of which was exceedingly soft and boggy, the wheels sank deeply into the hedge side, but by means of the double winding gear the wagon was easily extricated.

With a load of 5 tons on the platform and drawing a wagon with a load of 8 tons behind (making a total gross load of 28 tons), the severe ascent from Macclesfield to the "Cat and Fiddle" Inn, a rise of 1300 feet in 7 miles, was easily accomplished; the first and steepest portion being done on the high gear, with the fire door wide open and burning wood fuel. The latter part of the ascent required the low gear, and, owing to the boggy nature of the ground and the heavy rainfall, the wheels kept sinking in, the road rising up behind. The brakes were tested on the return descent, and after being on continuously for 4 miles the wagon was stopped without resort to reversing the engine.

A test was made to ascertain the consumption of wood and water with the same load, and the following result was arrived at:

	Time.	Water.	Wood.
Run of 19 miles.....	3 hr. 28 min.	208 gals.	6 cwt.
Per mile.....	10.9 "	10.9 "	35.3 lbs.
Per ton mile.....	..	0.84 "	2.7 "
Per gross ton mile.....	..	0.39 "	1.2 "

From this it will be seen that a running speed of 6 miles an hour was maintained, the boiler easily supplying all steam required. The low fuel and water consumption is ascribed to the large fire box ($3\frac{1}{2}$ feet long, 2 feet wide and 3 feet deep), allowing good combustion, and to the close nest of generator tubes above absorbing the heat; to the economical use of superheated steam in the engine, by the use of lift valves and small clearances, and, finally, to the high mechanical efficiency of the engine and gearing due to ample lubrication, careful alignment of bearings and the small amount of power wasted in the transmission. No shaft has more than two bearings, and these, if not in one rigid casing, are in ball swivel sockets, so that any twist in the frame has no effect whatever upon the transmission.—*London Engineering.*

The Drawback on Crucible Steel and Farriers' Tools.—The Treasury Department has rendered the following decision: On the exportation of crucible steel manufactured by the Heller Brothers Company of Newark, N. J., in part from imported Swedish iron, combined in the crucible with an average not to exceed 25 per cent. of domestic iron, and alloys in small quantities, the melt being run into ingots, which are then hammered and rolled into bars of required sizes and forms; also on the exportation of various kinds and descriptions of farriers' tools—such as rasps, files and hammers—produced from such steel by the usual manufacturing processes, a drawback will be allowed equal in amount to the duty paid on the imported material so used, less the legal deduction of 1 per cent. The drawback entry must show the net weight of steel in all forms exported, and the average percentage and weight of imported Swedish iron consumed in the manufacture. The said entry must further show, in addition to the usual averments, that the exported articles were manufactured of proportions of materials and in the manner set forth in the manufacturer's sworn statement, dated January 5, 1903. In liquidation, the quantity of imported Swedish iron which may be taken as a basis for allowance of drawback may equal the quantity consumed, as declared in the drawback entry, but in no case shall it exceed 75 per cent. of the net weight of all forms of steel exported, officially verified.

Crushed Steel and Steel Emery.*

An Artificial Abrasive Produced from Steel.

BY M. M. KANN, PITTSBURGH, PA.

This at present well-known artificial abrasive dates back its origin in a primitive way a good many years. Our first knowledge goes back perhaps 50 odd years, where in extreme cases in the German industries they required a cutting material which was harder than the known abrasives, such as emery and corundum, and which was within the reach of commercial necessity. They resorted to breaking up old files; but of course this was done in a primitive and uncertain way, and on a small scale and in laboratory experiments.

The writer's attention was first called to the article by the patentee, C. M. Lindsey, who being in the marble and stone cutting business conceived the idea of breaking up hard files as a medium for cutting. His efforts in a commercial way were unsuccessful, from the fact that there was no known means of making a uniform product, and the difficulty of breaking the files made it impossible to obtain any satisfactory results.

The writer became interested, and concluded that if methods could be found by which a uniform granular structure could be produced it must prove effective. This investigation resulted in the formation of the Pittsburgh Crushed Steel Company, Limited, of Pittsburgh, Pa., in the year 1889. After a vast amount of experimental work and a great many unsuccessful results, the proper methods were found to produce the article in uniform grains, structure and sizes of the requisite hardness or toughness, and at a cost of production where it could be put in successful competition with natural and other artificial abrasives. These products are used to-day quite extensively in all the known arts and industries, both in this and in foreign countries.

This abrasive is manufactured preferably from pieces of high grade crucible steel, heated to a temperature of about 2500 degrees F. (almost a white heat), and then quenched in a bath of cold water or other suitable hardening solution, which gives the steel a granular structure. The pieces are placed under powerful hammers or crushing machines and are reduced to small particles, varying from fine powder to grains of many different sizes. The steel particles are then tempered, preferably in the following way: They are placed in a cylinder or pan and heated to a temperature of about 450 degrees F. until the particles change their appearance to a straw color; they are then cooled by being subjected to cold air in various ways. The material at this stage, or before the tempering process, is graded into many sizes, according to the number of mesh openings of the sizing screen per square inch. The sizes of diamond "crushed steel" run in numbers from No. 5 to No. 60 inclusive. Diamond "steel emery" is similar to crushed steel, but it is given an intensely hard temper, and its numbers range from No. 60 to No. 200 and above.

These two abrasives, so closely related to each other, are used for entirely different purposes in the various trades. Crushed steel and steel emery rank very close to the diamond in hardness, being 9.27 if the diamond is taken at 10.

Crushed steel is tempered mostly to a tough hardness, while steel emery, having different work to perform, is made intensely hard. A grain of crushed steel, examined under a magnifying glass, exhibits a series of sharp points and cutting angles. In work, as fast as the point is worn down another is presented, while should a grain break it presents on the fractured face a multitude of new cutting points.

Crushed steel and steel emery are now used in the sawing, rubbing and polishing of stone, marble, granite, onyx, &c., in lens grinding, glass beveling, brick grinding, and by lithographers, engineers and plate glass manufacturers. If a bond could be found, so that these steel abrasives could be placed on the market in the form of a wheel or brick, the length of the above list would be much extended. The stone trade consumes an important

* Read before the meeting of the American Association for the Advancement of Science, at Pittsburgh, Pa.

amount of crushed steel. The natural abrasive used in the sawing and rubbing of stone for all time was sand, but sand in its use under the pressure and impact of the saw blades or wheels breaks down and dissolves into a slush and loses its cutting properties.

As the necessity for the reduction in cost and increased output arose in the production of stone, granite, marble, &c., chilled iron globules, better known in the commercial world as "chilled shot," took the place largely of sand in the stone trades, and was the only artificial abrasive known. But with the advent of crushed steel and steel emery it had to give way, and while chilled shot is considerably more expensive at first cost than sand, and again crushed steel more expensive than chilled shot, it resolves itself into the question of increased production, and has proven in all cases that crushed steel by its largely increased output has much reduced the cost of sawing and rubbing stone of all kinds. Sand cuts sharply for a little while, but pulverizes, and therefore cuts slow, and must be constantly renewed in large quantities. Chilled shot, of course, being harder is more effective, but from the nature of its structure rolls under the saw blades or rubber, and thereby crushes the grains of stone; while crushed steel, with its sharp and angular edges, becomes imbedded in the saw blade or rubber and acts as a tooth, and therefore cuts its way into the stone. Being very much harder and tougher than the natural sand, or, in turn, harder and tougher than chilled shot, its lasting qualities are much greater.

The various sizes of crushed steel are used on different kinds of stone. The largest sizes, Nos. 10, 12, 14 and 16, are employed to saw stone of a coarse texture, such as the well-known Connecticut brownstone. The Indiana oolitic limestone is best cut with No. 30 or No. 36, while the finer textured stones, such as onyx and marble, require such sizes as No. 46 or No. 50.

A small quantity of quicklime added to the crushed steel will prevent the oxidation of the steel particles, and has been used to advantage in some of the large marble cutting establishments in the United States.

In rubbing down granite to a surface fit for receiving a polish considerable care must be exercised in selecting the proper size. This is governed largely by the surface left by the stone cutter. Some polishers take the stone to a machine direct from the pointing tool, others from the axe and others from the four, six or eight cut hammer. The finer the cut from the workman the smaller sized steel is required. A serious mistake, however, is too often made by granite polishers. It has been the custom, from necessity, to bring a very heavy pressure to bear on the rubbing wheel; the formation of the grains of steel renders this great pressure unnecessary; in fact it is prejudicial, because it prevents rapid work.

Grain emery was formerly very largely used by granite polishers. Now steel emery is chiefly employed, and a surprisingly small quantity will smooth down a stone, thus increasing the speed of production.

In stone rubbing, glass beveling and brick grinding iron wheels revolved by power are used. For rubbing stone a plate of 12 to 13 feet diameter is used. In grinding brick this size is reduced one-half, and in glass beveling the ordinary size is 30 inches. But the process is the same in all cases.

The steel is continually kept on the move. From the revolving bed or wheel the grains of steel drop into a circular trough and are scraped out of this trough into a feed box, from whence they are automatically fed to the center of the bed. By means of this device a small quantity of the abrasive is in use.

The Pittsburgh Crushed Steel Company have also devised and have in use a number of attachments for the rapid and economical sawing, rubbing, grinding and polishing of stone of all characters, granite, marble, glass, brick, metal, &c.

Crushed steel has taken the place of the diamond in core drilling in many instances, and may eventually supplant it altogether for this particular use. Sixty-five feet of a 1½-inch core of Lake Superior sandstone has been taken out in ten hours with the use of No. 14 crushed steel, and one of the largest cores obtained was taken out with crushed steel from the Cleveland sandstone dis-

trict, being 130 feet in length and 6 inches in diameter. In practice the steel is fed alongside of a wrought iron pipe, and by the use of water is brought under the revolving pipe, which acts as a bit, the steel taking the place of the diamond under the bit.

Lens grinders are finding out the advantage of using diamond crushed steel and steel emery, both in speed and in cost. The abrasive is used over and over again so many times and cuts so rapidly that were it many times the price of emery it would still prove more economical. The cut always being uniform, the grinder knows just what surface each number will produce. For roughing in No. 70 or No. 90 is used, followed with No. 170 for finishing down. Washed flour emery has hitherto been the smoothing medium, but the finest size of steel emery may advantageously be employed for this work, and this material has been employed by some of the most extensive lens grinders in the United States. The Rev. John Peate of Greenville, Pa., who manufactured the mammoth lens for the American University of Washington, D. C., was very much assisted in his undertaking by the use of steel emery in the operation of grinding what was at that time the largest reflecting glass made in the world. Its application in the microscope and photographic lens grinding has been the means of cheapening the manufacture of this class of lenses.

Steel emery Nos. 150, 160 and 170 has taken the place of French sand in the lithographic trade in preparing the stone and for graining has no equal. Engineers are also finding out the value of this abrasive, which "cuts but never breaks." In grinding metal the work which steel emery will do is considerable, and now all important railroads in the United States and Canada consider it an indispensable material in their shops. Hardened tool steel, against which emery instantly pulverizes and which will resist the bite of a file, yields to the cutting power of these minute grains.

Lack of acquaintance with steel emery may lead the workman to believe that it has ceased to cut long before its power is exhausted. This is due to the absence of the peculiar grating sound produced in its operation, now deadened by the minute particles of abraded metal, which thicken the oil and so prevent the steel emery from doing its work properly. The addition of a little oil permits the grains of steel to move freely and new life is given to it. In ordinary grinding and on flat surfaces steel emery is used in precisely the same manner as ordinary emery, but special care must be exercised in its use because the grains of steel emery are so much smaller than the abrasive heretofore used for the same purpose. Oil must be applied sparingly to prevent the steel emery being drowned or floated away. On curved surfaces, or where there is a double seat, one above the other, it frequently happens that a lateral "dishing" or swinging movement cannot be given. Where such surfaces are to be ground the work should be frequently lifted, so as to prevent grooving.

Some years ago the Pittsburgh Crushed Steel Company, Limited, demonstrated the efficiency of crushed steel and steel emery by cutting two large meteorites, furnished by Prof. Henry A. Ward of Rochester, N. Y. One of them weighed 320 pounds and was sawed in a horizontal saw frame, using eight wrought iron blades, 4 inches wide by 3-16 inch thick and 8 feet long, and set about 2 inches apart. The second was cut with 12 blades under the same conditions and method, but was considerably larger and weighed about 550 pounds.

Cast iron has been employed in various ways by running the molten metal into water, so as to make it intensely hard, but the structure of cast iron does not permit it to withstand the hard use and abuse that is given to the crushed steel in the various fields of its usefulness, so that the cast iron product lacks the toughness, the wearing qualities and the granular structure of crushed steel.

The Treasury Department has rendered a decision on the drawback on fire plugs manufactured by the Florence Iron Works of Philadelphia, which contains the following: In the liquidation of the entries, a sworn statement of the amount of imported pig iron or scrap from imported pig iron used in the manufacture of fire plugs

in each shipment must be filed with said entry, to which amount shall be added 5 per cent. as nonrecoverable waste, and there shall be deducted from the weight of the finished larger size fire plug 76 pounds, and 31 pounds in each complete smaller size fire plug, said quantities representing fittings which are of domestic origin.

Western mining interests of Shenango Valley manufacturers have increased rapidly during the past two years. The Ethel Copper Company of Washington, near Seattle, have been acquired by capitalists principally from the Shenango Valley, who are preparing to erect a much larger stamp mill and also a smelter. The Castle Creek Gold Mining Company of Castle Creek, S. D., organized and financed by New Castle men, are installing a large reduction plant at Castle Creek in the Black Hills. The New Castle holdings in the Greene Consolidated Copper Company are very large, while the Annie

The Jas. D. Swindell Bell Coal Hopper for Gas Producers.

To the many inventions patented by Jas. D. and Jas. H. Swindell, and owned by the American Furnace & Machine Company, Pittsburgh, Pa., is added another invention of Jas. D. Swindell, that of a bell coal hopper, which is herewith illustrated. This hopper will appeal to all users of producer gas, on account of its being smokeless or gas tight and easy to operate. It is so arranged as to prevent any gas from escaping while charging the producer with coal, which it is claimed no other bell hopper has been able to overcome. Referring to the illustrations, this object is accomplished by means of the shaft D turning in journals at the sides of the hopper E, with sprocket C attached in the center, to which the bell F below is connected by means of a chain. The lever K is attached to the end of the shaft outside the hopper, thus not necessitating a slot directly

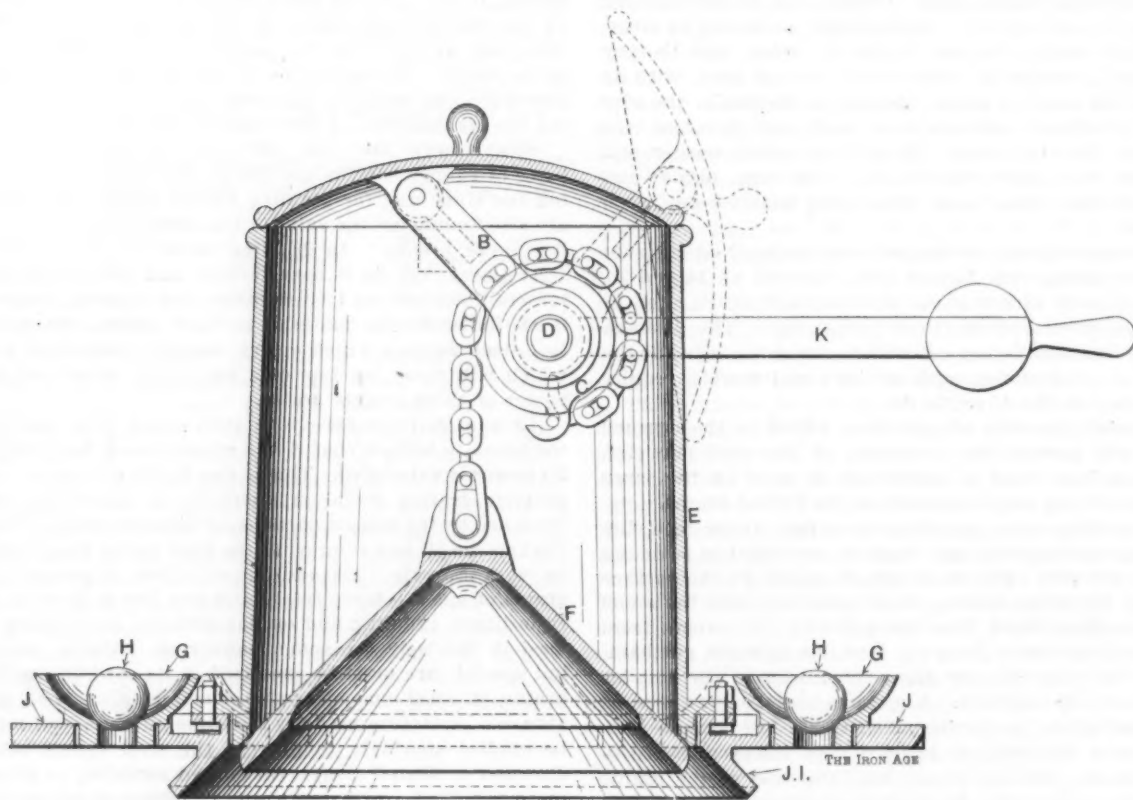


Fig. 1.—Elevation.

THE JAS. D. SWINDELL BELL COAL HOPPER FOR GAS PRODUCERS.

Laurie, a mine of considerable note, is owned by Sharon and New Castle people, and some of them are largely interested in a corundum mine in Montana. Many of the mines owned by New Castle and Sharon people are coming in as dividend payers, and there is a consequent excitement among investors to get into the mining business, which has resulted in the sale of immense quantities of mining stocks in the different valley towns. Probably \$1,500,000 worth has been bought in the Shenango Valley during the past three years.

The Washburn-Crosby Company of Minneapolis have purchased a site in Buffalo and will erect a flour mill that will have a capacity of 3000 barrels a day, to be increased as occasion demands until its output capacity shall have reached 5000 barrels a day. Some of the contracts for the structural work have already been awarded, and it is understood that a Buffalo concern have captured the steel work and that the company are now negotiating for the necessary motors. The new mill will be thoroughly modern in its equipment. It will be operated by electric power transmitted from Niagara Falls.

through the hopper for the lever to work in, as in others, and which allows the escape of gas.

The lid is entirely different from any heretofore gotten up. It fits gas tight and is always in place, and not easily broken, as is the case with some. It is fastened to the hinge B by a bolt, the hinge being loosely fastened around the shaft, so that when the lid is pushed back it raises slightly and drops down behind along the side of the hopper. Another good feature is the arrangement for poking. The saucer shaped poke hole plate G is made to fit in hole I, which is in plate J. This is made loose, so that the poke hole can be cleaned out from the top of the producer. The hole is closed by the ball H, which rolls of itself to place as soon as the poker is withdrawn. The plate J supports the hopper and poke hole saucers and balls. The flange J I is turned down so as to stiffen plate J, where the heat strikes most, and to support the brick of the arch. This hopper can be applied to almost any gas producer.

At a meeting of the Western Society of Engineers held at the society's rooms, Chicago, on January 21, G. A. Linday spoke upon lattice trusses, giving some de-

scriptions of curious kinds, with illustrations. T. L. Condon presented a paper on "Specifications of Material and Workmanship for Steel Structures," which had previously been circulated among the members, and was open to discussion.

The American Card Clothing Company.

WORCESTER, MASS., January 26, 1903.—A committee of the stockholders of the American Card Clothing Company, appointed at the last annual meeting to examine into the company's methods of doing business, have sent a printed report of their findings to each of the stockholders. One of the committee is William E. Rice, formerly president of the Washburn & Moen Mfg. Company, and another was the late Jerome Wheelock, in-

aged 682,000 square feet of clothing, of the value of \$946,000 per year. Throughout this period good dividends had been paid to stockholders, and in addition a surplus of earnings had accumulated of \$267,000. From about the end of this period a falling off in the amount of sales is noticeable, so that for the succeeding period of six years, ending with December 1, 1901, the sales averaged but 472,000 square feet, of the value of about \$618,000, per year. This shows a decrease in sales of over 30 per cent. in feet, and over 34 per cent. in value, sales in no year of the last six reaching the average of the first period. The diminished earnings of the company during the last period is attributed by your president and treasurer to the decrease in sales, and the falling off in sales to the strong competition for business from competing manufacturers, particularly by English

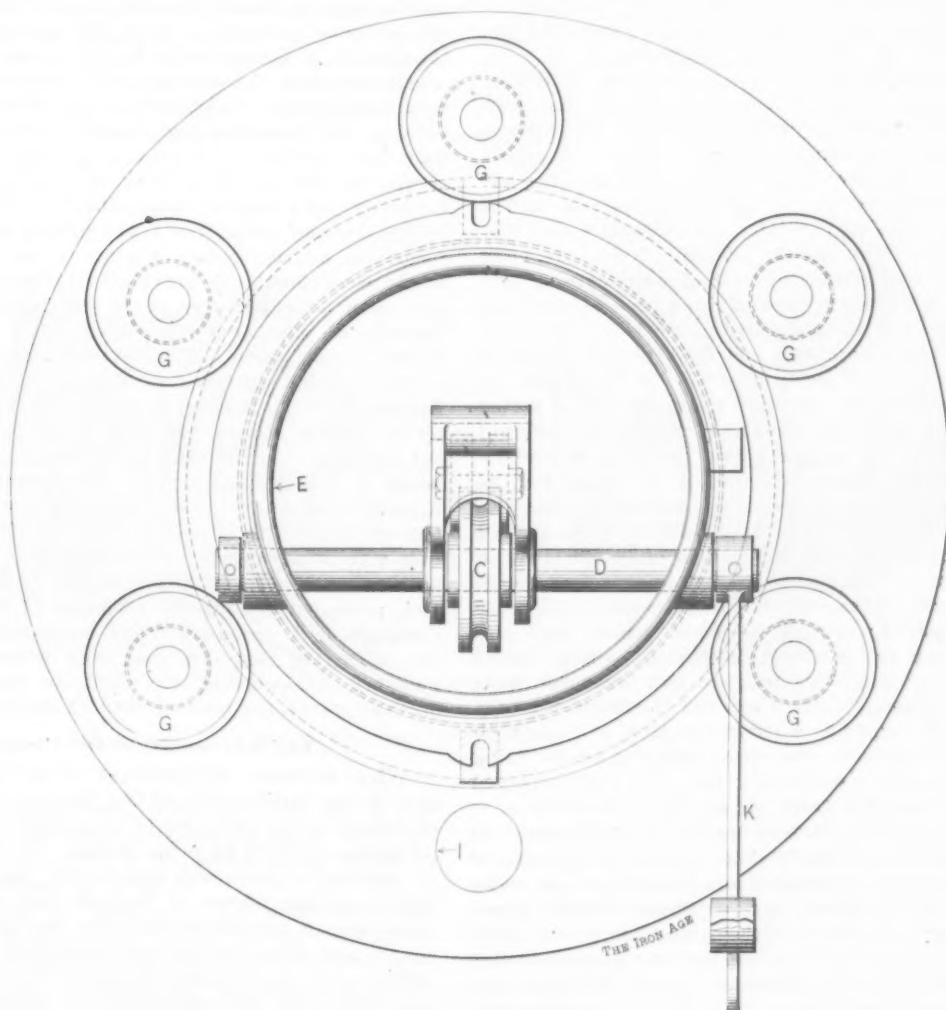


Fig. 2.—Plan.

THE JAS. D. SWINDELL BELL COAL HOPPER FOR GAS PRODUCERS.

ventor of the engine which bears his name, who died before the report was completed. The American Card Clothing Company were organized in 1890, being the combination of 13 manufacturers of this product. They now operate plants at Worcester, Leicester and North Andover, Mass.; Philadelphia, and Providence, R. I. They recently closed a factory at Lowell, Mass. The committee recommend that the salary list of \$60,000 a year is too great for a company doing a gross business of \$618,000 and employing only 160 hands; that the number of plants should be further decreased and the business thus further concentrated, and that the board of 17 directors should be reduced in number. The report says of the business:

"The corporation commenced business July 1, 1890. At the close of the fiscal year, December 1, 1895, the company had been in business for a period of five and five-twelfths years, during which period their sales aver-

aged 682,000 square feet of clothing, of the value of \$946,000 per year. Throughout this period good dividends had been paid to stockholders, and in addition a surplus of earnings had accumulated of \$267,000. From about the end of this period a falling off in the amount of sales is noticeable, so that for the succeeding period of six years, ending with December 1, 1901, the sales averaged but 472,000 square feet, of the value of about \$618,000, per year. This shows a decrease in sales of over 30 per cent. in feet, and over 34 per cent. in value, sales in no year of the last six reaching the average of the first period. The diminished earnings of the company during the last period is attributed by your president and treasurer to the decrease in sales, and the falling off in sales to the strong competition for business from competing manufacturers, particularly by English

firms. Of the original 13,734 shares of capital stock 1034 shares have been repurchased at par—viz., \$102,300 --and constitute the chief item of the investment account in statements of condition."

This report has created a mild sensation and will be heard from at the annual meeting of the stockholders in February. It is understood, however, that during the past year the new blood infused into the directory at the last annual meeting has been effective, and that radical changes in methods of doing business will be reported at the annual meeting.

"Commercial Expansion" is the title of a new monthly issued at Chicago. The January number contains articles by David M. Parry, president of the National Association of Manufacturers; by John M. Glenn, secretary of the Illinois Manufacturers' Association; by Henry M. Hoyt and Alexander H. Revell.

Metric Weights and Measures in Germany.

Dean R. Mason, vice and deputy consul-general at Berlin, has furnished the State Department with the following exceedingly interesting report:

In view of proposed legislation to render the metric system obligatory for Government use in the United States, an effort has been made to ascertain from commission agents, importers, &c., in Germany how far the use of English weights and measures in the United States is considered a hindrance to the trade between the two countries; secondly, what results have been obtained by the introduction of the metric system in Germany, and the value of these results as bearing upon the question at issue in America. Considerable difference of opinion was found among the parties interrogated as to the extent of the hindrance caused by the use of different systems in the two countries.

An American commission agent residing at Berlin, who is constantly bringing American and German business men into connection with one another and who is quite intimately acquainted with the import and export trade between the two countries, considers that the use of the awkward system at present employed in the United States is a very decided inconvenience and hindrance to trade between the two countries. He cited various instances where injury had been caused, and among others the misfortune of an American who had his goods seized at the German Custom House and was involved in a law suit with the Government, owing to a blunder caused by the use of the two systems. A Hamburg commission agent and a German citizen stated that he was firmly convinced that the use of different weights and measures in the two countries caused inconveniences that made themselves seriously felt in every export and commission house dealing in American goods; that the conversion into decimal units caused serious loss of time; that the system of bookkeeping in use in Germany could not be applied to American goods. On the other hand, another Hamburg commission house dealing largely in American goods, which made inquiries among the different importing houses, stated that while the American weights and measures were considered extremely awkward and inconvenient, they were not looked upon as a serious obstacle to trade with the United States, as the firms accustomed to doing American business were used to them and employed tables for converting from one system to another.

Judging from the various sources of information at hand it would seem likely that the use in America of the present system of weights and measures, while causing some inconvenience and increased clerical labor, does not seriously hamper the American export trade through the large German commission houses dealing regularly with the United States. With the firms buying only occasionally from America, the inconvenience of the two systems is felt more keenly. American firms unacquainted with exigencies of foreign trade and seeking to obtain connections or business abroad continue to send circulars in the English language, in which our weights and measures are used, the result being that they generally find their way to the waste paper basket without serious consideration. A consular officer has not infrequent opportunity to observe difficulties created by ignorance of the metric system on the part of Americans, who are placed at a disadvantage, owing to their ignorance on this subject. Particularly in the export of machinery, in which complicated specifications are often requisite, the difficulties caused by the use of the two systems are especially apparent.

German Experience.

On August 17, 1868, the law was published which made the use of the metric system permissible after January 1, 1870, and obligatory after January 1, 1872. According to the testimony obtained at the Berlin Chamber of Commerce and through other reliable sources of information, the general use of the metric system in wholesale business was introduced promptly without serious inconvenience or opposition and with very satis-

factory results. In retail trade some of the old weights and measures are still in use, after having been modified in order to correspond with the metric system, the old names being still retained. The German pound, for instance, is exactly $\frac{1}{2}$ kg., and many articles are sold at retail by the pound, half pound, &c. Professor Fischer, who was in charge of the German Bureau of Weights and Measures at the time the metric system was adopted, and is probably better qualified to judge of the difficulties encountered in its introduction into Germany than any one else, stated in a personal interview that no serious or concerted popular opposition to the innovation was encountered, and that owing to the period of time after the law was published before the metric system became obligatory the public was well supplied with metric weights and measures and more or less familiar with their use. Professor Fischer is fully convinced as to the great benefit derived by the German nation from the change. As to the expense involved by the change, it is impossible to derive any very definite conclusion from the statistics and reports of the German Government. Information was asked on this point both by the American and English Governments some time ago, together with data, as to the difficulties and results of the introduction of the metric system into Germany, but a careful examination of the reports made by the German authorities failed to give any definite information on this point. Owing to the different economic conditions that prevailed in Germany 30 years ago such information as could be obtained relative to the expense entailed by the introduction of the metric system would necessarily be of very limited value.

Prior to the introduction of the metric system, the Zolpfund, which is equal to $\frac{1}{2}$ kg., had been introduced by the custom houses, and was in general use throughout Germany, but the German currency of 1872 was not based on the decimal system, as is the case with the American currency. It is questionable whether the retention of the Pfund and some of the other old measures was of advantage. Professor Carstens, who is an authority and who published several books on the subject, protested against the retention of any of the old measures in a pamphlet which appeared in 1868, and his prediction that this half way measure would be punished by delaying the complete adoption of the decimal system has been verified by subsequent events.

The Advantages of the Change.

While German experience as to the difficulties incident to the introduction of the decimal system may be of limited value, there can be no question as to the great advantage derived from the change. On this point, public opinion is practically unanimous; whether it be the experts of the bureau of weights and measures, business men, or manufacturers, only one opinion has been found, and when the radical advantages of the metric system over the weights and measures formerly in use are considered, this unanimity is almost a matter of course. It is only those who have used the metric system after having been accustomed to the use of other weights and measures who can realize fully its great superiority when calculating or computing. The only example of the advantages of the decimal system for purposes of calculation over other systems that can be readily observed by the American public is the far greater ease and rapidity with which it is possible to calculate in dollars and cents than in pounds, shillings and pence. While, owing to the great number of semi-independent States in Germany, the need of a single authorized system of weights and measures was still more imperative than in the United States, the advantages to be derived in America by the adoption of the metric system are practically the same as have already been attained in this country. Owing to its scientific character and greater simplicity the German citizen has a far more complete comprehension of the weights and measures of his country than the American. He saves a great deal of time and labor, both at school and in later life, and numerous possibilities of error are avoided. Considering the inherent advantages of the metric system and the experience of Germany and other countries where it has been introduced, it is safe to

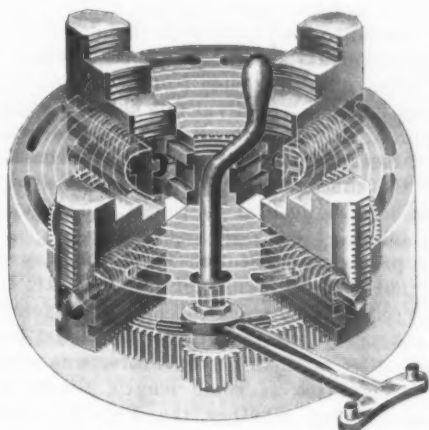
predict that if it ever comes into general use in the United States there will be the same unanimous verdict both as to its satisfactory character and the wisdom of its adoption that is given in Germany to-day.

The metric system has spread with ever increasing rapidity throughout the civilized world. It has been adopted by the European States, with the exception of England and Russia, and by most of the South American States, by Mexico, and even by Turkey and Egypt. Unless the American people are willing to see the civilized nations using one universal system of weights and measures and the United States and the more backward countries like China adhering to their old and clumsy weights and measures, it is likely the metric system will have to be adopted. Both in England and Russia the sentiment in favor of the metric system seems to be growing steadily, and it is likely that it may be adopted in these countries within the near future. It is probable that the agitation in favor of the adoption of the metric system in the United States will continue, and that if it is not introduced now it may be introduced later on when the change would involve far greater expense and inconvenience. With the popula-

itself, there being offered to the public \$3,000,000 of 5 per cent. first mortgage gold bonds of the Buffalo & Susquehanna Iron Company. These bonds are redeemable after June 1, 1907, at 107½ and accrued interest. To the iron trade generally the little book is more particularly interesting as probably the very best popular description of pig iron manufacture printed in a good many years. It reveals a complete grasp of the subject, is accurate, and is so written that it is readily understood by the layman.

The Westcott Spur Geared Scroll Lathe Chuck.

In the geared scroll combination lathe chuck, made by the Westcott Chuck Company of Oneida, N. Y., the power applied to produce the universal movement of the jaws is transmitted by a strong spur pinion, which engages with a spur gear cut on the edge of the steel scroll. The spur pinion is operated by a drop forged open end wrench, which enters through an opening in the edge of the chuck and engages with a hexagon pinion shaft, and may also be operated from the face



THE WESTCOTT SPUR GEARED SCROLL COMBINATION LATHE CHUCK.

tion increasing 20 per cent. every ten years and a rapidly expanding industrial development, it is important that the metric system, if it be adopted at all, should be accepted as promptly as possible.

In considering the question of the adoption of the metric system in the United States, the one valid objection that can be raised is the difficulty of the change. Owing to different political and industrial conditions the experience of European countries is of limited value to the United States; but their experience tends to show that the radical measure of rendering the metric system permissible for a certain period, after which it becomes the only system that is legal, is an effectual way of bringing it promptly into general use, and is far more economical and satisfactory than half way measures. The experience of Germany also shows that an efficient bureau of weights and measures is one of the most potent and necessary factors in making such a change.

While the general introduction of the metric system into the United States will undoubtedly cause temporary expense and trouble, the benefits derived from its adoption will be permanent, and a far greater population than that of the United States at present will be materially benefited by the change.

"Concerning Iron Making."—Under the title "Concerning Iron Making, with Special Reference to the Buffalo & Susquehanna Iron Company," there has been published in very attractive form an illustrated pamphlet by Elisha Walker for Fiske & Robinson, bankers, of New York and Boston. The primary object is to explain to would be investors the merits of the company

of the chuck by a key, which fits a square socket in end of the pinion shaft. In other respects the chuck is the same as the company's scroll combination chuck. The scroll may be rapidly manipulated by a lever engaging directly with it at the back, as in the old chuck, and increased gripping power then gained by applying the open end wrench to the spur pinion. The increased grip is due not only to the fact that a spur gear is used, but also to the use of an open end wrench, to which a man may apply as much power as he pleases without danger of breakage. The power of the lathe itself may be applied to the wrench by allowing the wrench handle to strike the lathe bed.

At a recent meeting of the Milwaukee Foundrymen's Association, at Hotel Pfister, Milwaukee, Wis., a resolution was adopted extending a formal invitation to the American Foundrymen's Association to hold its next annual convention at Milwaukee in July. While it is believed that the sense of the meeting held at Boston last June was in favor of Milwaukee, the decision remains with the Executive Committee, the officers of which committee meet at New York in February. It is believed in Milwaukee that the next annual gathering of the American Foundrymen's Association will be attended by upward of 500 members.

Inquiry at the machine shops of Worcester, Mass., finds the demand for machine tools unabated and the larger shops rather busier than they were a month ago. The machine tool men report that the advance of 10 per cent. agreed upon among themselves has not affected their business apparently.

Passage of the Ray Bankruptcy Bill.

Defects in the Present Law Cured.

WASHINGTON, D. C., January 27, 1903.—The Senate on the 21st inst. passed, with amendments, the Ray bill intended to cure defects in the federal bankruptcy law. The measure originated in the House, where it was passed at the first session of the present Congress, and upon its passage by the Senate the House Judiciary Committee promptly reported in favor of accepting the Senate amendments, and the bill will therefore receive the President's signature within a few days.

The passage of the Ray bill will be the cause of general gratification throughout the business community. The federal law as a whole has proved infinitely more satisfactory than the patchwork State legislation on the subject of insolvency previously in force, but, as was to have been expected, the trying out of the law in scores of bankruptcy tribunals developed certain serious defects which demanded prompt correction. The Ray bill was drawn to meet this situation, and represented the combined wisdom and experience of the National 'Referees' Association, the National Credit Men's Association and other business organizations, and received its finishing touches at the hands of Judge Ray, then chairman of the House Judiciary Committee, and one of the framers of the original statute.

The Ray bill was passed by the House without an important amendment of any kind, but when it reached the Senate it encountered some criticism, chiefly because of certain provisions increasing the cost of the administration of the law. The point was also made against the bill that its provisions were framed rather more in the interest of the creditor than the debtor class. It was therefore decided to refer it to a subcommittee, of which Senator Nelson of Minnesota was made chairman, and this subcommittee devoted the holiday recess to a very careful revision of the House bill.

The measure as reported and passed and accepted by the House contains a number of important modifications. The provision of the bill to the effect that exemptions must be deducted from assets, in order to determine an individual's insolvency, has been stricken out. An important change has been made in Section 5, which stipulates the conditions under which discharges may be granted. This section as amended by the Senate reads as follows, the words in parentheses having been stricken out of the Ray bill, and those in italics added by the Senate Committee:

"b. The judge shall hear the application for a discharge, and such proofs and pleas as may be made in opposition thereto by parties in interest, at such time as will give parties in interest a reasonable opportunity to be fully heard, and investigate the merits of the application and discharge the applicant unless he has (1) committed an offense punishable by imprisonment as herein provided; or (2) with intent to conceal his financial condition, destroyed, concealed or failed to keep books of account or records from which such condition might be ascertained; or (3) obtained property on credit (upon a materially false statement in writing made by him to any person for the purpose of obtaining credit, or of being communicated to the trade or to the person from whom he obtained such property on credit) *from any person upon a materially false statement in writing made to such person for the purpose of obtaining such property on credit*; or (4) made a fraudulent transfer of any portion of his property to any person) (4) *at any time subsequent to the first day of the four months immediately preceding filing of the petition transferred, removed, destroyed or concealed any of his property with intent to hinder, delay, or defraud his creditors*; or (5) (or denied) *in voluntary proceedings* been granted a discharge in bankruptcy within six years; or (6) in the course of (his) *the proceedings in bankruptcy* refused to obey any lawful order of or to answer any material question approved by the court."

The Senate has materially cut down the increased fees provided by the Ray bill, the reductions ranging from 25 to 50 per cent. of the fees provided by the orig-

inal measure. The Senate Committee is of the opinion that one of the great merits of the Federal statute has been the moderate schedule of fees and the consequent division of the great bulk of bankrupt's estates among creditors.

Probably the most important provision of the present law modified by the Ray bill is the feature of Section 57g, which, as construed by the United States Supreme Court in the case of Carson, Pirle, Scott & Co., requires creditors receiving payments on account of current indebtedness any time within four months of the filing of the debtor's petition in bankruptcy to surrender such payments in full before being entitled to prove up the balance of their claims. This interpretation of the law by the highest court has had a very serious effect in many parts of the country, and has detracted more than any other defect in the statute from its harmonious and effective operation. The problem presented by this section has been solved by the Senate by the adoption of the substitute provision incorporated in the Ray bill, which is as follows:

"g. The claims of creditors who have received preferences, voidable under Section 60, subdivision b, or to whom conveyances, transfers, assignments, or incumbrances void or voidable under Section 67, subdivision c, have been made or given, shall not be allowed unless such creditors shall surrender such preferences, conveyances, transfers, assignments, or incumbrances."

Senator Nelson urged in lieu of the above amendment a modification of his own, under which persons receiving payments on account might retain them, but would receive no dividends from the estate until all the creditors had received dividends equal to such payments on account, after which all would share equally. This did not meet the views of Senators Fairbanks and Turner of the subcommittee, however, and after some discussion it was decided to retain the provision of the House bill.

The provision of Section 17 of the Ray bill, to the effect that when a bankrupt in any State has waived to his creditors his right to claim his exempt property the bankruptcy court shall not set apart to him such exemption as against his creditors, was considered by the subcommittee at some length, the chief point of discussion being whether the Federal statute should make any provision with regard to exemptions under the State laws. It was finally decided to strike out the whole of Section 17 of the Ray bill.

The Senate Committee has added a proviso to Section 55, subdivision b, of the Federal statute relating to dividends, which is as follows:

"Provided that the first dividend shall not include more than 50 per centum of the money of the estate in excess of the amount necessary to pay the debts which have priority, and such claims as probably will be allowed; and provided further, that the final dividend shall not be declared within three months after the first dividend shall be declared."

The purpose of the above amendment is to enable the trustees to take care of all debts which have priority, and to prevent the closing of an estate until every means of developing assets has been exhausted.

Two new sections have been added to the Ray bill, as follows:

"That neither the referee nor the trustee shall in any form or guise receive, nor shall the court allow them, any other or further compensation than that authorized and prescribed in this act."

"That the provisions of this amendatory act shall not apply to bankruptcy cases pending when this act takes effect, but such cases shall be adjudicated and disposed of conformably to the provisions of the said act of July 1, 1898."

Although, in addition to the amendments above referred to, a considerable number of minor verbal changes were made in the bill, it will be observed that upon the whole the Senate has not made any important changes in the House measure, except in the matter of reducing fees and providing additional safeguards against fraudulent preferences. Under these circumstances the House Judiciary Committee decided that it would be wiser to accept the Senate bill without change

than to take the two measures into Conference Committee, and perhaps risk the defeat of the bill through the inability to have it again considered by both houses at the present session. The outcome is, therefore, very satisfactory to the friends of the Federal statute in both houses, and will no doubt be equally so to the business men of the country.

W. L. C.

Tariff Agitation in Congress.

Senator Lodge Proposes Maximum and Minimum Rates.

WASHINGTON, D. C., January 27, 1903.—The presentation in both Houses of Congress by prominent members of the majority party of propositions looking to some form of tariff revision, and possibly to the recasting of the entire tariff system of the United States, has already attracted international attention and promises to become an important subject of debate in both Houses before the end of the session. The measures referred to have been presented in the Senate by Senator Lodge of Massachusetts and in the House by Representative Tawney of Minnesota, an active member of the Ways and Means Committee. Senator Lodge's proposition has been brought forward in the form of a Senate resolution, which does not require the concurrence of the House, and which provides as follows:

Resolved, That the Committee on Finance be instructed to inquire and report to the Senate whether any, and if so what, countries discriminate against any article or articles the growth or product of the soil or industry of the United States, by levying upon such article or articles duties, imposts, excises or taxes in excess of those levied upon similar articles imported from other countries, or whether they in any way fail to admit the products of the United States on terms as favorable as those accorded to any other nation.

Second, That if it should appear that any country or countries discriminate against the United States as in the manner aforesaid, the Committee on Finance shall report to the Senate whether it is not advisable that a suitable law shall be enacted by which maximum and minimum rates of duty shall be established in such manner as to give preference and advantage in rates of duty to the products of those countries which do not discriminate against the products of the soil or industry of the United States, but admit them on an exact equality with similar articles the products of other countries and on the terms and at the rates of duty accorded to the most favored nation.

The proposition to substitute a maximum and minimum tariff for the present Dingley act, with its single set of schedules and reciprocity provisions, as found in sections 3 and 4 of the law, has been under consideration in high Republican quarters for a long time. President McKinley made the suggestion to a number of Republican members of the Senate at several conferences held in Canton in the summer of 1901. His idea at that time was that the Dingley rates should be accepted as the maximum and that Congress should enact a minimum schedule, so that in negotiating reciprocity treaties the Executive would have authority simply to determine upon what items the minimum rates should be accorded, but should have no power to fix such rates. While the operation of a maximum and minimum tariff is thus fairly well understood by the Senate leaders, the subject is not generally comprehended in the Senate, and developments will be awaited with much interest. Mr. Lodge's resolution is being held in the Senate at the request of Senator Aldrich, who desires to deliver some remarks upon it before it is referred to the Finance Committee. Senator Lodge will also speak upon the resolution. Inasmuch as complete discretion in the matter is accorded to the Finance Committee by the resolution, it is quite probable that it will be favorably reported and passed by the Senate.

A Congressional Tariff Commission Proposed by Mr. Tawney.

An investigation into the desirability of a maximum and minimum tariff is also a part of a measure introduced in the House on the 24th inst. by Representative Tawney in the form of a joint resolution requiring the concurrence of both Houses, the full text of which is as follows:

Be it Resolved, &c., That the President *pro tempore* of the Senate and the Speaker of the House of Representatives, re-

spectively, be, and they are hereby, authorized and directed to appoint a joint committee of the houses of Congress, to consist of six Senators and eleven Representatives elected to the Fifty-eighth Congress; and that said committee when appointed be and it is hereby authorized and directed before the meeting of the first session of the next Congress to thoroughly inquire into and investigate the present conditions of domestic and foreign production and the necessity for any modification of the duty on any or all of the articles upon which duty is now imposed by law; whether any reduction thereof can be made consistent with reasonable protection to American industry and labor; by what means and in what manner the foreign trade of the United States can best be protected and extended and whether the tariff system known as the maximum and minimum tariff possesses for the production, industries, business interests and foreign trade of the people of the United States advantages superior to our present conventional and general tariff system, and that said committee make a full and complete report of such investigation and submit its conclusions thereon to the Fifty-eighth Congress when the same convenes in regular session in December, 1903; and be it further

Resolved, That for the purpose of making such investigation and to facilitate the same, said committee be and is hereby authorized to sit at such times and places as it may decide, and is authorized and empowered to send for persons and papers, and its chairman be and is hereby authorized in the discretion of said committee to administer oaths to persons appearing before said committee; and that such committee is also authorized to employ such persons to assist in the work of such investigation as it may deem necessary; that the members of the committee shall receive no compensation for their said services except their actual expenses incurred while engaged in the work of investigation hereby authorized, and that the actual expenses so incurred by said committee and by the members thereof, and the salaries of the persons employed to assist in such investigation, shall be paid out of the contingent funds of the Senate and House of Representatives in equal proportions.

The appointment of a tariff commission has been urged upon Congress by a variety of interests. The greatest pressure, however, has been brought to bear in favor of the authorization of a so-called 'nonpartisan' commission, to consist of experts familiar with the various domestic industries and with industrial and commercial conditions in the leading foreign countries. It is recognized, of course, that there is a wide difference between such a commission and that covered by Mr. Tawney's resolution. The nonpartisan commission is not popular among the House and Senate leaders, and Mr. Tawney points out that under his resolution experts of the highest character could be employed to assist in the deliberations of the joint committee and in the preparation of whatever measure or report it might be decided to make. A member of the Ways and Means Committee, who is disposed to favor the Tawney resolution, in discussing it said to the correspondent of *The Iron Age*:

"We have been much interested in the proposition for the appointment of a nonpartisan tariff commission, presumably embracing no members of the House or Senate, but the difficulty with such an arrangement would be that after the commission had prepared a bill, for example, both the Ways and Means and Finance committees would be obliged to begin at the beginning and investigate the whole subject to ascertain the ground upon which the committee reached its conclusions. Under Mr. Tawney's proposition, however, no such investigation would be necessary. The joint committee of the two Houses would actually be made up from the Ways and Means and Finance committees and would act as subcommittees of the two Houses, holding joint sessions. They would have the advantage of all the expert assistance necessary and upon the conclusion of their deliberations their report would be received by the Ways and Means and Finance committees as conclusive of the whole subject, and it is assumed that after a moderate amount of formal discussion in committee, reports could be made to the House and Senate without delay."

Under the rules of the House Mr. Tawney's resolution has been referred to the Ways and Means Committee, before which he will endeavor to obtain a hearing at an early date. It is the opinion here that the committee will defer action on the resolution until the eve of adjournment, and that the decision then reached will depend in some measure upon the fate that in the meantime befalls the Cuban and other reciprocity treaties.

W. L. C.

The Iron Age

New York, Thursday, January 29, 1903.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.
JOHN S. KING,	- - - - -	BUSINESS MANAGER.

The Iron Age Index.

The Index to the reading matter of Volume LXX of *The Iron Age* for July 1 to December 31, 1902, has been compiled and printed, and will be mailed to those subscribers of *The Iron Age* who will make application for it.

In order to relieve those who bind or file *The Iron Age* of the trouble of future applications for the semiannual Index, we have a special list to whom the Index is forwarded without further notice. Subscribers who desire to be entered upon that list will kindly so advise us.

The Coal Famine and the Illinois Anti-Trust Law.

The outcome of the agitation of the coal question at Chicago is to be a decisive test of the Illinois anti-trust law of 1891 before the Supreme Court of the State. It is a consummation probably welcomed as much by the Illinois Manufacturers' Association as by the indicted coal men, and by all corporations within the limits of the State.

The dismissal of the indictments against the coal men as individuals and a trial of the corporations engaged in mining, selling and distributing coal, upon an agreed statement of facts, clears the way for a speedy decision by the judiciary. The dismissal of the criminal individual indictments, too, seems only an act of justice in the face of the finding of the special grand jury impaneled to fix the responsibility for the coal famine. The State's Attorney certainly cannot be consistently charged with being unmindful of the public welfare; quite the reverse; and now that the public mind is less inflamed, the State Attorney's action, founded upon clear, cool judgment, after mature deliberation, will be applauded. In charging inconsistency against the finding of the Grand Jury the coal dealers and mine operators have the support of the legal adviser of the Manufacturers' Association, which organization was instrumental in bringing about the investigation, and from the text of the finding of the Grand Jury this attitude seems well grounded.

After stating general conditions relative to the abnormal condition of the coal industry throughout the country—resulting in very high prices and in much annoyance, inconvenience, physical and mental suffering and pecuniary loss—the jury found that principally and primarily the cause of the fuel famine was the recent great strike in the anthracite coal fields, resulting in an enormous decrease in production, which prevented the usual storing of anthracite coal for winter consumption. It was also found that bituminous coal could not be mined and stored in sufficient quantities to make good the deficiency in the anthracite supply, because the capacity of the mines could not be increased to such an extent on short notice, and also because the storing of bituminous coal during the summer is inexpedient. What increase in production of bituminous coal was possible was absorbed, principally in the East, in supplying

trade which heretofore had consumed only anthracite coal.

The jury brought forward statistics showing that Chicago alone received during the year 1902 over 1,500,000 tons of anthracite coal less than in 1901, regarded as equivalent to about 3,000,000 tons of bituminous coal, while to offset this loss there was an increase of less than 800,000 tons in receipts of bituminous coal. Simultaneously with the decreased supply an enormous increase in demand was experienced because of the great industrial expansion of the country and the phenomenal increase in the business of the railroads, as well as increased requirements for domestic consumption. Another potent cause for the scarcity of coal at Chicago was found in the inability of the railroads to handle the enormous tonnage of general freight offered for transportation, the equipment being available only to meet normal requirements, whereas extraordinary conditions obtained.

Thus the jury found that the abnormal conditions resulted from natural causes, and were not due to, or appreciably influenced by, any conspiracy or combination in restraint of trade or by any attempt to forestall the market, although they recognized instances of individual cases of breach of contract and extortion. They disclaimed having evidence that even such instances were due to anything but individual unfairness or greed, nor did they find these instances to have been more numerous or more aggravating than might naturally be expected under existing circumstances.

It was further explicitly stated that the mine owners had made great efforts to increase the production of coal, and that shipments from Illinois mines to Chicago had been largely increased. In unequivocal terms were the mine owners absolved from any intention of taking advantage of abnormal conditions to prey upon the community. So, also, were the railroads absolved from the charge of entering into a conspiracy to hold back supplies; the transportation companies, indeed, being credited with having done all in their power to relieve the strained situation. And yet, while the jury was convinced that the working of the natural law of supply and demand accounted for the high prices prevailing, they did find that there existed in the city of Chicago (and in the State of Illinois, outside of Chicago) and in the neighboring States certain combinations which are deemed to be conspiracies or combinations in restraint of trade within the meaning of the statutes. Having found that such combinations existed they were compelled to take notice of them.

Whether the Illinois Manufacturers' Association and the indicted corporations now occupy common ground is of little importance, but it is worthy of note that the legal representative of the Illinois Manufacturers' Association claims that the association does not now take, and has never taken, the same attitude which the indicted coal companies are taking with reference to the anti-trust statute under which the indictments have been brought. The Illinois Manufacturers' Association attacked the constitutionality of the so-called anti-trust law of 1893, and was sustained. It also questioned the legality of another act of 1893, requiring corporations to make affidavit that they do not belong to trusts or combinations. In this, too, the association was successful, and the State appealed from the decision, the appeal being now under advisement by the Supreme Court of Illinois. Contrary to the general impression, the act of 1891, divorced from the law of 1893 and the anti-trust affidavit statute of the same year, has never been attacked by the Manufacturers' Association.

Another phase of the situation that has become prominent is the claim that the indictments recently found open the door to the prosecution of labor unions. This seems to be a mistake. The law of 1891 prohibits only agreements to fix prices or limit the quantity of merchandise or commodities produced, sold or mined in the State of Illinois. The special provision in the statute relating to labor unions is as follows: "Provided, however, that in the mining, manufacture or production of articles of merchandise, the cost of which is mainly made up of wages, it shall not be unlawful for persons, firms or corporations of this State to enter into joint arrangements of any sort, the principal object of which is to maintain or increase wages."

This is regarded as an unfair discrimination, favoring combinations of labor against combinations of employers of labor, and this in itself seems to present a vulnerable point of attack against the constitutionality of the law of 1891, being class legislation.

Benner's Prophecies.

Those who are apprehensively looking forward to a protracted depression as a natural sequence to the exuberant demand of the past 18 months will derive much comfort from a study of Benner's "Prophecies." According to the theory of the Ohio farmer, that ups and downs in prices recur in well defined cycles, we have since 1899 been passing through a period in which the general trend of prices has been downward. The movement downward will continue until 1904, but that year will see the end of the decline, and a recovery will then set in, carrying prices upward, which will not reach its culmination until four years later, or in 1908. Merely as a matter of interest to our readers, and not because we regard the Benner theory as having been sufficiently demonstrated to make it a safe business guide, we will briefly state the basis upon which his forecast of the course of prices was founded. Mr. Benner carefully studied the course of prices in several staple articles for a long series of years and in 1875 made the announcement that he had discovered that during that time prices had moved up and down in cycles. He placed the periods between high prices on iron as running along successively for eight, nine and ten years. The intervening years, during which prices were declining and then advancing, were divided, according to the above order, into six years down and two up; five years down and four up; seven years down and three up. According to his theory, we are now in one of the nine-year periods between years of highest prices, 1899 having marked the last apex, and 1908 being the next to come. In this nine-year period five years are assigned as the years of gradually receding values and four years as those in which prices will be steadily ascending. The year 1904, according to this calculation, will be the year of greatest depression in the entire nine-year period. According to the Benner theory, therefore, if a depression in the iron trade should set in this year it will not have long to run, as an era of improving prices is due in 1905, to run for four years. After 1908 a seven years' decline is prognosticated, followed by three good years, making a ten-year period between the next two years of highest prices.

Many of the older members of the iron trade attach much importance to these cycles as laid down by Mr. Benner. It must be admitted that the periods of depression and activity which have occurred since the first publication of his prophecies have quite closely corresponded with his law of price cycles as then set forth.

The great boom of 1879-80 and the long depression terminating in 1897 occurred according to his prior calculations, as well as intervening changes up and down, although occasionally the movement did not begin or end in the precise year fixed by him. But he explained in his book giving the results of his studies of prices that occasionally a great strike or other influence seriously affecting business might for a time appear to counteract the tendency apparently established for that period by the law of cycles. Thus, in the past year, the scarcity of fuel, caused by special circumstances which upset all natural conditions, prevented the production of pig iron reaching the volume which would otherwise have been attained and prevented the recession of prices which would then have taken place.

The Benner theory would appear to indicate that either this year or next is due a financial disturbance paralleling that of 1884, which marked the ebb in business activity following the boom of 1879-80, and from which the recovery to prosperous times was speedy. Those whose houses were in order easily withstood the shock of 1884 and perhaps derived greater profit from the good times which set in in 1885 than from the short-lived boom of 1879-80.

The Anthracite Industry.

The lessening interest in the inquiry into the relations between operators and miners in the anthracite industry, now being conducted by the Strike Commission, is significant. As the rule the daily newspapers outside of the coal counties have discontinued the publication of the testimony. When the matter was a novelty and the labor leaders were presenting their case the proceedings were read with eager interest by citizens of all classes. The allegations of the plaintiffs were startling, and created a widespread feeling of sympathy for the unfortunate wage earners of the coal region. Mitchell "rested" on what looked like a very good case against the operators. Since then the defendants have been engaged in an effort to show that the operators and not the miners are the ones who have a grievance. They have gradually, but effectually, demolished the tissue of fiction built up by Mitchell and his carefully selected witnesses under the direction of clever but perhaps not too scrupulous counsel, and have established the fact to the satisfaction of most of those in interest that the miners' troubles are chiefly those of their own making. Probably one contention is as honest as the other.

A few days ago Mitchell, pleading engagements elsewhere, ostentatiously withdrew from the hearing and announced that he should not attend further hearings. This was his privilege. Perhaps he was permitted to exceed his privilege in making a speech which has been interpreted by many well informed persons to mean that if the decision of the Commission on the points submitted for arbitration is not to the liking of the membership of the United Mine Workers the union will refuse to be bound by it. Perhaps such refusal will not be expressed in words, but it is a fact which does not admit of dispute that the operators are the only ones bound by the arbitration, or in a position to feel the pressure of public opinion as a compelling force. No member of the union need work unless he wants to, and what is true of one is equally true of the 147,000 claimed as the membership of the United Mine Workers in the anthracite field. The claim that 3000 miners are now idle in contravention of the agreement of the operators as an essential element of the *modus vivendi* under which

work was resumed, since they cannot get the employment they apply for, will probably be urged as excusing any violation of the pledges made on behalf of the union. Beyond those known to have been engaged in crimes against persons or property, the only persons qualified to mine coal who are idle in the anthracite district are those who have applied for restoration to places they voluntarily abandoned during the strike, and which are now filled by persons whom the mine superintendents will not discharge for less trustworthy and no more competent strikers.

This being the situation, it is difficult to understand why the leading operators do not take the matter into their own hands and perfect a plan for the immediate reorganization of the anthracite industry which shall not only anticipate any possible advantage the Commission can award the miners, but permanently correct the causes which have kept the business in a condition of unstable equilibrium for as many years as the present generation of business men can remember. So far from being impossible, this is not even difficult. A large part of the membership of the United Mine Workers was gained and is held by the conviction among the miners that the operators cannot be trusted to deal fairly and honestly with the men unless held to their obligations by a power they respect and dread as much as they resent it. How much or little foundation there may be for this distrust need not be considered. That it exists is evident; and it will continue to exist until the operators adopt and offer to labor a system which contains within itself a guarantee of permanent fair dealing.

There is, and for many years has been, an excess of mine labor in the anthracite district. It is claimed that it was brought there originally to intimidate the resident labor and discourage strikes. It is a widespread belief that its coming has been subsequently encouraged for the same purpose, and being there the union has had to take care of it, partly because of a sense of obligation to do so, and partly because its numerical strength was needed to effect its purposes. The result has been that the mining of anthracite coal has had to sustain a force of miners and laborers considerably exceeding the maximum requirement of the industry.

It is true that this condition of affairs is partly dictated by the conditions inherent in the anthracite coal mining industry. A very large proportion of the consumption is for domestic purposes. The demand therefore must always be intermittent, since comparatively few householders purchase their supplies of fuel before it is urgently needed. In the past inducements have been offered to bring about the taking in of coal during the summer, and to some extent storage has been resorted to. Modern methods have reduced the cost of this very materially, but there is always the drawback that consumers shy at the effects which exposure has upon the appearance of the coal.

The oversupply of labor in the regions is also due to some extent to the methods which have so long prevailed in the industry. Each road has had its percentage of the tonnage, and promptly all prepared for the usual demand for a larger participation by opening up an unnecessarily large number of collieries, so that capacity was at all times far ahead of the requirements, and with it an unduly large operating force had to be maintained.

The conditions therefore have been partly due to natural causes, which could be mitigated, and partly to artificial causes, which should be removed.

It needs no argument to show that no scale of wages could possibly be satisfactory on the past basis of em-

ployment of labor. Intervals of idleness are demoralizing and breed dissatisfaction. The ambitious man resents this restriction of his earning capacity, and employs his leisure in nursing his grievances, real and imaginary, until they seem, and indeed are, intolerable.

If without awaiting the slow conclusion of what appears to be an interminable inquiry the associated operating companies would put the problem of reorganizing their industry on the lines of modern business development into competent hands for solution, there is reason to believe that results much more satisfactory and permanent could be reached for both mine owners and miners than the arbitration decision will effect. The colonies of alien laborers, herded in boarding houses and hoarding their earnings to take abroad, are a blight upon the counties in which they have gathered. They should be made to scatter and be absorbed by other districts or into other occupations where the educational influence of association with more intelligent labor would reach them. This dispersion could be effected by restricting the opportunities of employment in and about the anthracite mines to the number which can be given fairly constant employment, say a minimum of 275 days in the year, unless curtailed by mine accidents. The earnings of such labor could be much increased without seriously increasing the cost of coal per ton or imposing any burden upon consumers which is not willingly borne under existing conditions. The standing grievances of labor could be met and corrected by extending as far as possible the contract system, and making each class of labor its own employer in a sense. A permanent Board of Control having jurisdiction in all labor matters should be established, in which labor would have an equal voice with the representative of the ownership of the mines, to investigate and correct any just causes of complaint brought to its attention by either side. Petty impositions, such as arbitrary docking, overcharge for powder and the like, should be ended without discussion, and other means be sought for securing clean coal and a reasonable use of explosives. They are not sufficiently advantageous to the operators to repay the trouble they create. Agreements should be offered those willing to enter into them as individuals which will guarantee the permanence of advantages promised, and the union need be neither recognized nor antagonized. Its hold upon the better class of the miners and mine laborers is not so strong that its influence could long restrain them, if at all, from the acceptance of arrangements promising an immediate and permanent betterment of their condition. They are ready for a change, and would welcome it if it promised them more than the union can command. The anthracite industry will never reach a permanent and satisfactory basis until this is done. The arithmetic of the matter is very simple. If the average wage cost of coal is \$1 per ton, an output of 50,000,000 tons in 300 days gives a wage fund of \$50,000,000. If this is divided among 147,000 men there is less than an average of \$1.14 per day for each. That is too small an average wage to be satisfactory. Divided among 100,000 men it would give an average of \$1.67 per day, which is much better. If 80,000 men working steadily throughout the year could win that output it would bring the average a little over \$2 per day, which would be entirely satisfactory. That 80,000 men working 275 days in 365 could mine and raise as much coal as would 147,000 men working an average of 172 days is believed by those best qualified to judge. If this is true, or nearly true, the excess of labor now employed in the mines is a disadvantage and a detriment to all concerned.

The British Iron Trade.

The Locomotive Combine.

LONDON, January 17, 1903.—The event of the week undoubtedly has been the great combine in the Glasgow locomotive trade. Neilson, Reid & Co. of the Hyde Park Locomotive Works, Springburn; Dubs & Co. of the Glasgow Locomotive Works, Polmadie, and Sharp, Stewart & Co. of the Atlas Works, Springburn, are now one concern, short of a few formalities, with capital fixed at £2,000,000. This is an event of the very first importance, for it means now that more than half of the locomotive manufacturing trade in this country is in a combine. The three companies between them employ 7500 workmen, or more than half the total number of employees engaged in this industry in the United Kingdom. But it will clearly be understood, of course, that the employees in the locomotive works of the great railway companies are excluded. The following comparative table shows the number of men employed in the various establishments in the British locomotive engine industry:

	1902.	1901.	1900.
Neilson, Reid & Co.....	3,410	3,460	3,331
Dubs & Co.....	2,423	2,183	2,128
Beyer, Peacock & Co., Limited.....	2,165	2,040	2,063
Sharp, Stewart & Co., Limited.....	1,737	1,670	1,616
Kitson & Co., Limited.....	1,507	1,473	1,444
Vulcan Foundry, Limited.....	1,196	1,151	1,075
R. Stephenson & Co., Limited.....	908	632	622
Nasmyth, Wilson & Co., Limited.....	344	505	472
Manning, Wardle & Co.....	514	436	509
Hunslet Engine Company.....	300	305	314
A. Barclay, Sons & Co., Limited.....	349	329	301
Yearly totals.....	14,853	14,183	13,875

The principal object of the combination is to reduce costs and give quicker deliveries. Another significant little announcement has found its way into the public ear, which is to the effect that the three firms concerned will be sufficiently strong to put down works of their own, if necessary, for the manufacture of certain materials, the price of which is at present kept up by subcontractors, regardless of the state of trade. Anybody who knows to what an extent cartels are carried in Glasgow and district will appreciate the importance of this hint.

Neilson, Reid & Co. were founded in 1837, originally under the name Neilson & Co. The name was changed to Neilson, Reid & Co. in 1894. Dubs & Co. were established 40 years ago by Henry Dubs and William Lorimer. Sharp, Stewart & Co. were originally a Manchester firm, but Glasgow offering greater inducements, especially in the way of men trained to locomotive work, the works were removed to Glasgow from Manchester in 1883, an amalgamation being brought about soon afterward between them and the Clyde Locomotive Company, originally formed by Walter Montgomerie Neilson. The capacity of the combined establishments will be about 600 engines of the British type per annum. Neilson, Reid & Co. at present average about five per week, Dubs & Co. about four, and Sharp, Stewart & Co. about three. On an average, therefore, fully 12 locomotive engines per week can be produced by the three Glasgow firms. Of the capital, £2,000,000, £1,000,000 will be in ordinary £10 shares, and £1,000,000 in 5 per cent. cumulative preference shares. All the ordinary shares are allotted to the vendors in payment of the fixed assets. The 5 per cent. cumulative preference shares are offered to the public.

The Market.

A fairly good feeling prevails throughout the metal markets, and, compared with the closing days of the old year, some improvement may be reported. This is, however, due to the natural result of the opening up of business usual at this season of the year. Another element of importance has been the easing of European competition. At the beginning of the year certain German firms notified increases, and in general this increased price of German material is maintained, although some small German merchants are selling off considerable weight at old prices. Another element is that the requirements of consumers are slightly above the average, owing to the very small amount of business placed during Decem-

ber. At that time contracts were well worked off and stocks were brought down to the lowest possible point. Since the turn of the year a number of substantial contracts have been placed. The bearing in price of pig iron has had a good effect in inducing consumers to show more confidence and to buy in larger quantities. Contracts are quite frequent for the next three months and some have been extended to six months. Steel makers, too, are having a slightly better time, some good contracts having been completed for billets, blooms and plating bars. There has been also some speculative buying in structural steel and mild bars, and in consequence quotations are firmer, with an upward tendency, which has not, however, materialized in a rise in prices. There is a good demand for best iron and marked bar makers are quite happy. The unmarked bar makers are unfortunately in quite a different posture. Business comes to them slowly and in small lots.

In the Midlands it is important to note a revival of the attempt to secure the reimposition of extras for small irons and to secure this end an association of small iron manufacturers has been started. This question has been up before the Unmarked Bar Manufacturers' Association, and resolutions have been reached affirming the desirability of reverting to the former custom, particularly among the makers of round bars of $\frac{3}{8}$ inches or less. It is contended that the extra work and extra care necessary in rolling this small iron make prices ruling for unmarked bars unprofitable, and it is stated that manufacturers in this line are working at a loss. The Unmarked Bar Makers' Association having apparently been unable to get further than an academic resolution, those firms who make small iron have come to the conclusion that the only way to secure their object is to form an association and to agree among themselves not to sell unless the extras are obtained. I understand that so far 18 makers have agreed to become members and there are only one or two as yet undecided. They fear that increase of price may divert orders to Germany. The imposition of extras means an increase of price varying according to the class of iron, from 2 shillings 6 pence up to £1 per ton. Of course, if the small iron manufacturers can obtain this increased price, all well and good, but as a number of merchants are at the present time buying largely in this very class of goods from Germany and Belgium, it seems doubtful if they can succeed. Prices this week have been as follows:

Pig Iron: Scotch, 53 shillings 0 pence; Middlesbrough, 47 shillings 11 pence; Hematite (West Coast), 58 shillings 6 pence; Staffordshire cinder, 49 shillings; part-mine, 48 to 50 shillings; all-mine, 57 shillings 6 pence to 67 shillings 6 pence; best ditto, 80 to 85 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 47 shillings 6 pence to 50 shillings; Derbyshire, 50 to 51 shillings; North Staffordshire, 51 to 52 shillings; Lincolnshire, 53 shillings 1 penny.

Public stores stocks:

	Tons.
Connell's, at Glasgow, Thursday, January 15.....	23,380
Connell's, at Middlesbrough, hematite, Thursday, January 15.....	1,300
Hematite, West Coast, Wednesday, January 14.....	24,773
Connell's, at Middlesbrough, Wednesday, January 14.....	126,747

Finished Iron: Marked bars; £8 10s.; Earl of Dudley's brand, £9 2s. 6d.; second grade, £7 10s.; common unmarked bars, £6 10s. to £6 15s.; North Staffordshire bars, £6 15s.; angles, £7 to £7 10s.; sheets, singles, £7 7s. 6d. to £7 12s. 6d.; doubles, £7 10s. to £7 15s.; trebles, £8 2s. 6d. to £8 7s. 6d.; galvanized corrugated sheets, f.o.b. Liverpool, £11 5s. to £11 10s.; hoop iron, £7 5s. to £7 10s.; nail, rod and rivet iron, £7 5s. to £7 10s.; gas strip, £6 15s. to £6 17s. 6d.

Steel: Bessemer billets £4 12s. 6d. to £4 17s. 6d.; Siemens billets, £4 15s. to £5; mild steel bars, £6 10s. to £7; steel plates, £6 5s. to £6 15s.; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £6 5s.

The Supply of Ore.

The present and future supply of ore is of perennial importance in this country, and however confident ironmasters may be in expressing themselves as to the certainty of the supply of a good grade ore, it is none the less true that at bottom they are nervous, if not actually anxious. To begin with, the Narvik district is not in the least going to be monopolized by British buyers. Hitherto the bulk of the ore from the Gellivare mines in Sweden has been shipped from Lulea, which lies at the extreme point of the Gulf of Bothnia in the Baltic,

and is therefore closed during the winter season. Narvik, fronting as it does the Northern Sea, is open throughout the year. The railway connection with the mines and the shipping facilities, which for some years have been in process of construction, are now completed, and the first shipments of ore have just been made per the steamship "Lovstakken" and another steamer. Further, the Hamburg-American Company of Hamburg some time ago contracted to carry 1,000,000 tons of ore per annum for ten years, beginning from this year, on behalf of Krupp's works at Essen. Boats have been specially designed for the trade, with a tonnage from 6000 to 7000 dead weight capacity, and they are now being delivered by the builders to the owners. This huge Krupp contract is for the conveyance of Swedish ore from Narvik to Rotterdam, from which port it will be transhipped to Krupp's works at Essen. In addition to this contract a Newcastle firm of ship owners have just arranged to carry 10,000 tons of ore from Narvik to Grangemouth and another 20,000 tons to Middlesbrough during the present year. Of course, during the summer months Lulea will still have a look in, but I do not doubt that in course of time Narvik will be the port to which business men will look for their supplies. It is evident, however, that this market is going to be shared between Germany and Great Britain. If the ore in course of time is found to be of good grade, it is not improbable that keen competition will take place between British and German buyers, with the result of stiffening of prices which must have its effect in British and German competition with Americans in neutral markets.

From a report to hand this week I gather that the iron mines in the neighborhood of Bilbao have seen their palmy days, and that their output must be expected to show a diminishing tendency as years go on. The supply of Vena and Campanil is becoming exhausted, and the Rubio, which makes the bulk of present exports, is, with rare exceptions, less pure and rich in its proportion of iron than it was few years ago. But dying mines have a habit of lingering an unconscionable time before they yield their last ton of ore. In Bilbao, as elsewhere, a mine opens itself out in the process of working, and fresh deposits are being constantly discovered where none were previously thought to exist. It is said that fears of coming exhaustion were expressed almost as loudly 10 or 15 years ago with respect to the Bilbao mines as they are to-day, and some interested observers are inclined to think that the same thing will be said 20 years hence.

More Tube Combinations.

The recent combine of those great tube makers, Lloyd & Lloyd of Birmingham, and Stewart & Menzies of Glasgow, has led to other tube manufacturers coming together for protective purposes and negotiations are in progress for the formation of an association of British tube makers. Stringent monetary conditions are to be enforced against any firm breaking the agreement. It is hoped by this means that price cutting may be finally stopped.

S. G. H.

The American District Steam Heating Company of Lockport, N. Y., are erecting a large addition to their plant, which will be used as a machine shop, doubling their present capacity. The company also have a new foundry in course of erection at North Tonawanda. They now are engaged in laying street heating systems and have men in charge of such work in Baltimore, Md.; Birmingham, Ala.; Paducah, Ky., and Rockford, Ill. The company recently declared a quarterly dividend of 1 per cent. on their capital of \$1,000,000.

The Wm. Cramp Ship & Engine Building Company, Philadelphia, Pa., launched on the 24th inst. one of the largest oil carrying steamships built in the United States, the "Col. E. L. Drake," building for the Standard Oil Company. The "Drake" has a capacity of 1,500,000 gallons, and is equipped with engines that can use either oil or coal as fuel. The vessel is 360 feet long, 50 feet beam and a depth of 28 feet 6 inches, and her speed will be over 12 knots per hour. The "Drake" when com-

pleted will ply between Beaumont, Texas, and Philadelphia and other ports.

The Colorado Fuel & Iron Company.

J. A. Kebler, president of the Colorado Fuel & Iron Company, has issued his annual report, under date of December 10, the publication having been delayed on account of the postponement of the annual meeting. He reports as follows:

"The net earnings from operating departments carried to the credit of income account were \$1,801,925.27, a decrease of \$340,746.53, as compared with the preceding year. The net earnings of the fuel department show a decrease of \$9133.07, and the iron department a decrease of \$318,133.31. In the fuel department the production of coal increased 756,678.25 tons, and of coke 212,761.95 tons. The total net earnings from all sources amounted to \$2,033,110.76, which provided for all fixed charges, sinking funds, preferred stock dividends, &c., leaving a balance of \$531,831.61, which was carried to the credit of profit and loss. The balance to the credit of profit and loss account is \$528,640.81, representing accrued and undivided profits at the close of the current business year. The application of net earnings to sinking funds has been on the usual basis as regards assumed depreciation on account of coal and iron ore mined, and an arbitrary amount of \$150,000 has been set aside to provide for the depreciation in value of the steel works plant at Pueblo and \$30,000 for the Laramie plant. The total amount of net earnings set aside as sinking funds for depreciation of property is \$382,786.15, and an additional amount of \$82,890.28 (being 2 cents per ton on all coal and ore mined) has been set aside as an emergency fund. Of the entire sinking funds provided for depreciation of equipment we have drawn on such funds to reduce the book value of equipment as follows:

Fuel department.....	\$648,425.01
Iron department.....	222,752.29

"The first new furnace was blown in September 5, 1901, but its operation has been very seriously handicapped by reason of the noncompletion of bins, casting machines and other accessories. None of the other improvements are as yet in operation. The delays have been very exasperating and are entirely due to outside contractors. As an example of the very serious delays encountered, the bins for the new furnaces, which were to have been completed July 30, 1901, were not completed until November, 1902. The engines and buildings for the different plants are none less than six months late.

"There have also been annoying delays in the improvements of the fuel department, but not to the extent of the iron department. During the year new mines were opened up at Hezron, Tabasco, Primero and Tercio, and new ovens constructed at Redstone, Tabasco, Segundo and Tercio. At Primero, now our largest mine, the first coal was shipped over a temporary tippie June 26, 1901. Owing to severe washouts on the railroad the mine was idle after that for six weeks, during which time many of the men left us. Despite this fact the mine produced last year 408,000 tons of coal.

"The decrease in the earnings of the iron department is due to additional cost caused by operating the steel works while so much construction was going on, the new construction interfering very seriously with the operation of the old plants, and in consequence it was only possible to operate them at all at a largely increased expense.

"Of the additional tonnage produced by the fuel department, only 283,000 tons of coal and 68,000 tons of coke were sold, the company using the balance, on which there was no profit. The decrease in earnings is due to the reduction of price on large contracts, which was necessary to keep the business.

"During the year \$10,000,000 of the new 5 per cent. ten-year gold debenture bonds were issued; \$931,000 of them were converted into common stock, leaving the amount outstanding at the end of the year \$9,069,000; the expense and discount of these bonds, amounting to \$622,187.71, was charged to equipment, iron department;

the interest on the bonds, amounting to \$351,855.26, was charged to income, although no returns have been received from the expenditures of money received from these bonds.

"The remaining Colorado Coal & Iron Company consolidated mortgage 6 per cent. bonds, amounting to \$2,441,000, were purchased and retired during the year, and the mortgage released, and the same amount of Colorado Fuel & Iron Company 5 per cent. general mortgage bonds were issued in their stead."

During the fiscal year ending June 30 there was expended on the equipment in the iron department \$7,195,640.42, including \$1,743,529.25 on the blast furnaces, \$471,460.50 on the converting mill, \$291,929.52 on the blooming and rail mill, \$156,838.71 on electric plant, and \$2,691,385.40 on the open hearth department, 40-inch reversing mill, rod and wire and sheet and tin plate mills. We understand that all these improvements, with the exception of the sheet and tin plate mills, will be completed by May, some of them being in operation now.

Buffalo Forge Company's Salesmen's Meeting.

In accordance with the custom established in 1900, the engineer salesmen of the Buffalo Forge Company assembled in Buffalo, N. Y., week before last for the general review of business, discussion of the coming year's work, inspection of plants and offices, including the works of George L. Squier & Co., recently purchased, and personal interviews with heads of the different departments. Sessions were held every day but Monday. On Friday afternoon a photograph of the salesmen was taken, copies of which are framed and annually presented to each, and Friday evening occurred the yearly banquet at the Iroquois Hotel, attended by 56 representatives.

At these sessions papers on the following subjects were presented, many of which were read and discussed: "Leather Drying," "Heating & Ventilating General Fire Proofing Company's Works," "A Tentering Cloth Drying Plant," "Malt Drying," "Fan System Apparatus for Various Industries," "Ventilation of Marquette School," "Coffee Drying," "Electric Light Engine Erection," "Facilitating Heating Plant Erection," "Utilizing Waste Heat of Gas Engines for Fan System Heating," "A Chalk Drying Plant," "New York, New Haven & Hartford Down Draft Forge Shop," "The Horse Power of Compound Engines," "A Fan System Egg Drying Plant," "Induced Draft Plant in Cement Industries," "Kenny & Co.'s Factory Heating Plant," "Induced Draft for Melting Brass and Copper," "Heating, Ventilating and Cooling in Lithographing Establishments," "A Peculiar but Efficient Heating Plant," "Heating and Ventilating an Apartment House," "Drying Plaster Paris Molds by the Fan System," "Tobacco Drying," "Heating and Ventilating a Large British Work Shop," "Gas and Special Blowers," "Gas Cleaning Fans." Copies of the papers will be made and sent around later to the various representatives.

Pacific Coast News.

SAN FRANCISCO, January 21, 1903.—Perhaps the matter of greatest interest to the hardware and iron trade on the coast at present is the conference being held at Chicago between the representatives of the San Francisco wholesale and jobbing trade, those of the Middle West and the Interstate Commerce Commissioners. Heretofore the representatives of the Middle West and the coast have been at war. This is an attempt to settle their differences by the more peaceful method of arbitration. The coast won in the first round, but its representatives, like sensible business men, desisted to submit details to the issue of a friendly conference. This does not mean that they have given up any of the broad principles for which they contended, but that they are willing to see that in settling the whole matter no substantial injustice is done to any one. Though the hardwaremen have borne their fair share of the fight, it is one in which every jobber on the coast is equally inter-

ested. The jobbers are well represented in the *personnel* of the men sent to Chicago. H. D. Loveland is an old grocery man, long the representative of the wholesale grocers and now the manager of Tillman & Bendel, while W. S. Wheeler of Holbrook, Merrill & Stetson and Alfred C. Rulofson of Baker & Hamilton have both spent a lifetime in the hardware trade. They represented the merchants before the Interstate Commerce Commission when it held its sessions in this city, are personally known to the commissioners, and in fact we could not have sent better men. With the final settlement of this vexed question the jobbers of this city will be saved a great deal of trouble, as they might have been forced in self defense to give up the railroad for the steamship in the transportation of the bulk of their goods. In this connection it may be noted that there is steady development of the sea route every day. The other day the big steamship "J. L. Luckenbach" arrived in less than 60 days from New York. She is a new vessel and will be followed by the "Lewis Luckenbach" on February 15. The first mentioned will sail for New York on February 1.

We have now several steamers on this route, so that there will always be abundance of competition.

Although business always eases off a little in January, there has been more doing this year than usual. The crops in the San Joaquin Valley lacked rain, but it has come at last, albeit we need a good deal more. The southern portion of the State has been especially fortunate this year so far, and altogether prospects at this writing are reassuring.

J. O. L.

The Parsons Turbo-Blowing Engine.

The Farnley Iron Company, near Leeds, England, have installed a steam turbine blowing engine, built by G. A. Parsons & Co. of Newcastle-on-Tyne, which is primarily designed to meet the requirements of blast furnace working. The plant delivers 10,000 cubic feet of air per minute at a pressure of 3 pounds. It replaces a horizontal reciprocating engine, having an air cylinder 7 feet diameter by 7 feet stroke.

The power end of the combination consists of a steam turbine of the usual type, which drives an air compressing turbine, the outfit consisting therefore of steam and blowing turbines, instead of steam and blowing cylinders as in the ordinary type. In its design and construction the air turbine is similar to the steam turbine. It consists of a cast iron cylinder in which is arranged a concentric shaft mounted on bearings and driven at a high speed. The annular space between the cylinder and shaft is occupied by rows of alternate guide and moving blades, the former being secured to the cylinder and the latter to the shaft. The air enters at the bottom of the turbine and finds its way to the two outer ends of the blade space, the two streams of air flowing toward the middle of the turbine, where they reunite and pass through an outlet to the blast mains.

On entering the turbine the air meets the first row of guide blades and is directed against the rapidly moving inclined blades, which impart to it a considerable longitudinal velocity toward the outlet end. A second row of guides again directs the air in a longitudinal direction onto the second row of moving blades, where it receives a further increment of velocity and pressure, and so on, until, on reaching the outlet end communicating with the blast main, it has the required pressure. There are no valves whatever on the air turbine. The pressure is maintained entirely by the velocity of the moving vanes. The blades themselves are clear of the case, and, of course, no lubrication is required in either the steam or the air turbine. The bearings are of the tubular oil cushioning type, similar to those used in turbo-electric generators.

The space occupied by a turbo-blowing engine is but a fraction of that required by a reciprocating plant. The whole of the mechanism is within easy reach of the attendant from the floor level, and no staircases or overhead platforms are necessary. It may be added that a by-pass valve can be arranged on the steam turbine, by opening which high pressure steam is admitted

to the low pressure parts of the turbine, and the pressure of the blast may thus be temporarily increased to about 40 per cent. to 50 per cent. above normal.

OBITUARY.

ROBERT P. LINDERMAN.

The untimely death on January 21 at his home on Fountain Hill, Bethlehem, Pa., of Robert P. Linderman, former president of the Bethlehem Steel Company, was a great shock to his family and friends. Death resulted from blood poisoning caused by an apparently trifling injury to his hand some days previously, and the fatal result was entirely unlooked for. Only a few days before his death Mr. Linderman was in New York City on business, apparently in the best of health. Robert Parker Linderman was born at Mauch Chunk, Pa., on July 26, 1863, and was the eldest son of Garrett B. Linderman. He received his education at the Mount Pleasant Military Academy, Sing Sing, N. Y., and Lehigh University, from which he graduated in 1884. After completing his course at the university he entered, in the fall of 1884, the employ of Linderman & Skeer, of which firm his father was the senior member. At that time this firm was one of the largest and most important of the individual anthracite coal operators in the State of Pennsylvania. On the death of his father, in September, 1885, he became the head of the firm, and successfully conducted its extensive business until the spring of 1896, when their coal beds being practically exhausted, they retired from business. Prior to this, however, other and greater responsibilities had been placed upon him. On January 31, 1885, he was elected a director of the Lehigh Valley National Bank of Bethlehem. At the death of his father, who was the founder of the institution and its first president, he was elected to the position of vice-president, and in 1888 he became president, being at that time, it was thought, the youngest national bank president in the United States. In December, 1885, Mr. Linderman took his father's place in the directorate of the Bethlehem Iron Company, becoming vice-president in June, 1888, and president in May, 1890. Hence, when but 26 years of age, he was at the head of one of the largest and most important of the great iron and steel industries of the world. In the spring of 1899 he was instrumental in organizing the Bethlehem Steel Company, and was elected its first president, while still retaining the same office in the iron company. Besides the positions of trust and responsibility mentioned above, Mr. Linderman was also a director in the Schuylkill & Lehigh Railroad, Juragua Iron Company, Limited, Earn Line Steamship Company, Jefferson Coal Company, American Ordnance Company and a director of the Times Publishing Company. He was also a trustee and member of the executive committees of Lehigh University, Bishopthorpe School and St. Luke's Hospital. During the past year Mr. Linderman relinquished his position with the Bethlehem Steel Company and devoted himself to his family and other interests.

JAMES OSCAR NIXON.

A most promising career was brought to an untimely end on December 27 by the death of James Oscar Nixon, late engineer and manager of the silent-chain department of the Link-Belt Engineering Company, Philadelphia. It is extremely rare that one of 23 years can be pointed out who is endowed with such industry, talent and intelligence as to have achieved a marked success in his work. Such, however, was the position obtained by Mr. Nixon. He was a native of New Orleans and a graduate of Tulane University of that city, class of '97. During his undergraduate days his energy, perseverance and personal popularity won for him a prominent position in the college world. After taking his degree in mechanical engineering, he took up post graduate work in sugar chemistry, occupying at the same time the position of chemist on a large plantation. After leaving the university he spent a year in Wilmington, Del., as a manager for one of the branches of a large foundry. Three years ago Mr. Nixon became connected with the Link-Belt Engineering Company, and was al-

most immediately assigned to the testing and mechanical development of the work of that company, and in this line he showed unmistakable genius. Later he was assigned to the important work of the commercial and mechanical development and introduction of the Renold silent chain. Mr. Nixon's paper presented in December, 1901, before the American Society of Mechanical Engineers, on "A Silent Chain Gear," is exemplary of his clear perception of points at issue and of his vigorous manner of expounding those in which he became interested. Less than a year ago Mr. Nixon was married.

CHARLES A. GODCHARLES.

Charles A. Godcharles, the founder and for many years the head of the Godcharles Nail Company of Milton, Pa., died on January 17 at his home in that town after an operation for intestinal trouble. He was born at Farrandville, Pa., December 8, 1843, and at an early age learned the trade of a nail maker. When the Civil War broke out he joined the 131st Regiment, Pennsylvania Volunteers, serving throughout the war. At its close he resumed work at his trade at Duncannon, Pa., subsequently becoming foreman of the nail mill of Van Allen & Co., at Northumberland. In 1875 he removed to Milton and organized the firm of C. A. Godcharles & Co., erecting the Milton Nail Works. They operated the Milton plant until 1888, during which time the company acquired extensive plants at Tonawanda and Northumberland. The firm dissolved in 1888, when the Milton mill passed into the hands of the Godcharles family. The business was reorganized by Mr. Godcharles' sons, F. A. and W. B. Godcharles, in 1895 under the name of F. A. Godcharles & Co. During the past few years the concern have been engaged extensively in the manufacture of muck bars. Mr. Godcharles is survived by his widow, three sons and two daughters.

NOTES.

W. S. CANRIGHT, for the past year assistant general manager of the Detroit Copper & Brass Rolling Mills, Detroit, Mich., died on January 22 at a hospital in Buffalo, aged 38 years. Mr. Canright was formerly purchasing agent of the National Cash Register Company, the Goodrich Transportation Company and the Northern Transit Company. His illness began with an attack of nervous prostration during the summer, which led to further disorders. Mr. Canright's business experience brought him into contact with a very large number of manufacturers throughout the country, among whom he enjoyed great popularity.

QUINTIN HOGG, of London, England, founder and president of the Polytechnic Institute, and editor of the *Polytechnic Magazine*, died suddenly January 17 of heart disease. He was born in 1845.

WM. LARMER, assistant foreman of the Shenango Valley Steel Mill, New Castle, Pa., died January 9. He was 39 years old and was a native of Pittsburgh.

ANDREW MCWILLIAMS, superintendent of construction at the Edgar Thomson Steel Works of the Carnegie Steel Company, at Bessemer, was killed in the yards of the works on Friday, January 9. Mr. McWilliams was one of the oldest employees of the Carnegie Steel Company, having been employed at the Edgar Thomson Works as superintendent of construction for nearly 25 years. He participated in the issue of stock given by Andrew Carnegie last year to his old employees.

W. P. CALLAHAN, head of the foundry and machine works of W. P. Callahan & Co., Dayton, Ohio, died on January 17 at his home in that city from injuries sustained by a fall on the ice. He was born in Ireland in 1813.

JOHNSON W. CARY, for many years foreman in the Singer Sewing Machine Works, at Elizabethport, N. J., died January 20 at his home in Elizabeth in his sixty-sixth year. He was an expert mechanical engineer, and originated a number of valuable mechanical devices. Mr. Cary was a veteran of the Civil War.

ELMER E. JENNINGS, a member of the firm of Orr & Jennings, machinists, died January 18, at his home in Portland, Maine, after a brief illness from pneumonia, aged 41 years. He was born in Lewiston, Maine, and had been in business in Portland for 13 years.

MANUFACTURING.

Iron and Steel.

The annual meeting of the stockholders of the Brier Hill Coal Company, operating Brier Hill furnaces, at Youngstown, Ohio, was held last week, at which the following officers were elected: George Tod, president; Henry Tod, vice-president; H. H. Stambaugh, secretary and treasurer, and J. G. Butler, Jr., general manager.

The Capital Coal & Iron Company of Nashville, Tenn., own 21,000 acres of land in the Sequatchie Valley, Tenn., containing both steam and coking coal. Some of the mines have been worked in past years with profitable results. The new company are vigorously prosecuting the further development of the property. The authorized capital stock is \$600,000; bonds authorized, \$600,000 of 35-year 6 per cents. Governor Benton McMillan of Nashville is the president, Hon. J. H. McMillan the vice-president and President W. W. Berry of the American National Bank of Nashville is the treasurer.

The Ohio Iron & Steel Specialty Company of Cuyahoga Falls, Ohio, are putting in a 10-inch Belgian mill, with an 18-inch roughing mill; also a scrap mill, consisting of three piles on boards, and two sand bottom scrap furnaces and one wash heat furnace.

The report that the works of the Lorain Steel Company, at Johnstown, Pa., were to be greatly enlarged this spring, at a cost of \$500,000, is officially denied. The only improvement now under way at this plant is a new assembling shop, which is nearly completed.

The Johnston Frog & Switch Works, located at Chester, Pa., will during this week make one of the largest shipments of rails, frogs and switches in its history. On Saturday a shipment of several carloads of material will be forwarded to San Francisco, and from that point will be shipped to the Oriental Construction Company, who are building a railroad in Japan.

An addition about 200 feet long is about completed at the Steel Car Forge Works, at Ellwood City, Pa. The plant is running day and night and is one of the most prosperous of the smaller concerns of Western Pennsylvania.

The Humbert Works of the American Tin Plate Company, at South Conneville, Pa., which have been idle since June 28 last, were started up on Monday morning, January 26. The plant contains six double sheet and pair furnaces, three annealing furnaces, six hot and six cold mills, and has an annual capacity of 12,000 gross tons of black plate for tinning, running on triple turn, and 6000 boxes of tin and terne plate, running double turn.

The Buckeye Malleable Iron & Coupler Company of Columbus are considering the erection of a blast furnace in connection with their Columbus plant. At present they buy all their iron.

The Siegel Iron & Metal Company of Toledo, Ohio, have been incorporated with \$10,000 capital stock, by Herman Siegel, Meyer Siegel, G. H. Siegel, Robert Fine and E. Fine. They will deal in scrap iron.

It is stated that John Stevenson, Jr., vice-president and general manager of the Sharon Steel Company, at Sharon, Pa., will be continued in that position by the United States Steel Corporation. It is reported that Nevin McConnell, now superintendent of the open hearth plant of the Union Steel Company, at Donora, Pa., may return to the Sharon plant in the same capacity. It is also likely that the universal mill at the Sharon works of the United States Steel Corporation may be utilized for rolling plates up to about 60 inches in width, instead of skelp, as first intended. Report has it that the sheet mills now under construction at Sharon may be removed to the Vandergrift works of the American Sheet Steel Company, at Vandergrift, Pa. However, the above contemplated changes are all subject to approval of the United States Steel Corporation officials.

Hugh Ferguson, furnace contractor, Pittsburgh, has been given a contract for all the fire brick work in connection with the blast furnace and four hot blast stoves to be built by the Detroit Iron & Steel Company, at Detroit, Mich.

The Youngstown Steel Casting Company, Youngstown, Ohio, will increase their capital stock from \$100,000 to \$200,000. It is the intention to more than double the capacity of the plant, and the increased capital will be used for this purpose. The Youngstown Steel Casting Company started business about a year ago and have been very successful. E. B. Lawrence is president, Thomas B. Van Alstine, vice-president, and John W. Rogers, secretary and treasurer.

The new three-high blooming mill at the works of the Jones & Laughlin Steel Company, South Side, Pittsburgh, has been started up. The mill was designed by Julian Kennedy and F. H. Treat and possesses the latest improved appliances for the economical and rapid handling of material. The new mill will be able to roll down sizes to about 7 x 9, after which the product goes to a two-high blooming mill to roll billets 4 x 4 in size. From this mill the product can be taken to a three-high mill for rolling billets, sheet bars, rails, &c. In connection with these mills it will be capable for furnishing billets

for the new Morgan 12-pass mill. The new mill is driven by two 42 x 76 x 60 tandem compound Corliss engines, with all the tables operated by electric motors instead of small reversing engines, as has heretofore been the practice.

At the annual meeting of the stockholders of the Jackson Iron & Tin Plate Company of Clarksburg, W. Va., held recently, T. Moore Jackson was elected president, W. I. Grove secretary and treasurer and C. C. Moore general manager.

The American Steel & Wire Company's Washburn and Moen works, at Worcester, Mass., are running fuller than ever before in their history. The local management admit that business was never better at the mills, and it is known that in most departments production is greater than it was during the flush of good times two years ago. One single order from the wire rope department to the rope wire department was for 500,000 pounds of rope wire, the biggest single order in the department's history, and altogether the rope wire department has over 1,250,000 pounds of wire on its order book, which is great. This only goes to show what is doing at the Worcester division's works. Everything is running night and day.

The Knoxville Iron Company, manufacturers of bar iron, Knoxville, Tenn., will remove their offices to Lonsdale, Tenn., which is in close proximity to the new plant which the company are now completing. The capacity of the new works will be double that of the Knoxville and Harriman plants which they are now operating.

The rolling mill of the Virginia Iron, Coal & Coke Company, at Max Meadows, Va., will shortly resume operation. About 75 men will be employed to make bar iron for use in the furnaces of the company. The horseshoe department will not be started up. This property, formerly owned by the Crescent Horseshoe & Iron Company, was operated for several years, employing about 300 men. When the Virginia Iron, Coal & Coke Company bought the iron interests of the Southwest this mill was one of the properties acquired. W. Newton has been appointed superintendent of the mill.

Every effort is being made to have the new forge shop of the Tindal-Morris Company, at Eddystone, Pa., ready for operation in the next 60 days. The work has been greatly retarded by the cold weather. The new shop is to be 100 x 120 feet in size.

The Wellman-Seaver-Morgan Engineering Company of Cleveland have been awarded the contract for the 48-inch universal plate mill of the Lackawanna Steel Company, at Stony Point, Buffalo, N. Y.

The Lalanc-Grosjean Mfg. Company, Harrisburg, Pa., are preparing to put in operation a new sheet mill. This company have refused to sell to the Pennsylvania Railroad Company a tract of 8½ acres of land adjoining the plant, and but recently purchased. It is understood that the company will in the near future make extensive improvements, one of which will be a large storehouse with tracks running through it to permit cars being unloaded and loaded under roof.

At the annual meeting of the Slatington Rolling Mill Company, Slatington, Pa., the following directors were chosen: Elias German, Alvin Haines, Frank De Long, Louis P. Hopkins of Slatington, J. F. Fonger, Philadelphia, and Edward Edwards, Catasauqua. The board elected Edward Edwards president, S. De Long secretary and treasurer, and Louis F. Hopkins superintendent.

The McInnes Steel Company, Limited, of Corry, Pa., contemplate the erection of a large addition to their plant. The company are manufacturers of self-hardening steel and hammered tool steel. The officers of the company are: W. G. Butler, president, A. McInnes, Jr., secretary, and H. E. Whittlesey, treasurer.

No. 2 blast furnace of the Carnegie Steel Company, at Duquesne, has been blown out for relining and extensive repairs. Improvements will be made and new devices added which will considerably increase the capacity of this stack.

Press reports state that a number of Syracuse and New York business men are organizing a company to manufacture tool steel by a new process. Wm. A. Hyle of the Hyle Bros. Steel Company is said to be at the head of the new movement. Mr. Hyle advises us that no definite developments have been accomplished as yet.

The Knoxville Iron Company, Knoxville, Tenn., have started the machinery at their new works and expect to be making iron in the next two or three weeks. Their capacity will be more than double their Knoxville and Harriman works. The offices will be closed and moved from the city to Lonsdale, where their new plant is located.

One of the plants of the American Tin Plate Company, at New Kensington, Pa., was compelled to close down last week on account of shortage of gas. Unless the supply increases it is possible the other works of this concern at New Kensington may also be compelled to close.

General Machinery.

The report purporting that extensive additions are to be built to the Pittsburgh plant of the American Locomotive Company is, according to official advices, premature, as no plans have been made for any extension as yet.

The Osgood, Bradley & Sons Company of Worcester are refusing orders, business enough being in hand to rush the shops in Worcester nearly a year. Orders include both steam and electric companies.

The Union Machine Company, Fitchburg, Mass., will open a branch shop at Sherbrooke, P. Q., for the manufacture of screen plates, &c., used in the paper industry. The machinery necessary for the business is now in process of manufacture and the first shipment there will be made in about a week or ten days. The company have secured a four-story brick building, about 100 feet long by 70 feet wide. The capacity of the new shop will be about 100 plates daily. The works here have a capacity of about 500 plates daily. Adams Crocker is the manager of the company, Emmons Crocker is treasurer and E. J. Welch is superintendent.

The Giddings & Lewis Mfg. Company, manufacturers of saw mill machinery, Fond du Lac, Wis., are building a new plant, which will be equipped with all thoroughly modern appliances and will be double the size of the present plant.

The Braddock Machine & Mfg. Company of Braddock, Pa., will increase their capital stock from \$200,000 to \$400,000. The additional capital will be used for making very extensive improvements and additions to their plant at Braddock, the output of which is rolls and rolling mill machinery of all kinds.

James E. McNary, Empire Building, Pittsburgh, will act as general sales agent for the sale of the Diescher shaft coupling. This coupling has recently been placed in a number of plants in the Pittsburgh district and is said to be giving very satisfactory results. Orders for these couplings have been received from the McKeesport Tin Plate Company, at McKeesport, Pa., and from the Baird Machinery Company of Pittsburgh. Mr. McNary, who also represents the Hooen, Owens & Rentschler Company, Hamilton, Ohio, has lately taken a contract to install a 28 x 48 Corliss engine in a new plant which will soon be built in the Pittsburgh territory. Another sale was a haulage engine, boiler, cable, rails, &c., together with a complete tippie equipment, for the Franklin Milling & Mining Company, Franklin, Pa.

The Cincinnati Shaper Company are now in their new plant, Colerain avenue, Spring Grove avenue and Elam street, Cincinnati, Ohio, in the center of the machine tool district. The main building is of brick and slow burning mill construction, the main floor of which is 90 x 290 feet, three-bay form, and unobstructed except by two lines of roof supporting posts. The offices and drafting rooms occupy a second story at the front end of building, overlooking the entire shop, and are 30 x 90 feet in area. The engine and generator room, the boiler house, fan room, locker room, toilet, &c., adjoin the main shop in an additional structure and cover altogether a floor space of 40 x 78 feet. The company's equipment has been largely augmented by the addition of new and improved machinery, selected with the view of securing the greatest accuracy and efficiency in production. An increase of over 60 per cent. in productive capacity has been secured by the erection of the new plant. Direct switching facilities with all of the leading railroads entering Cincinnati have been secured, so that prompt shipments will be greatly facilitated. The efforts of the concern will be devoted to the production of shapers of a high standard, exclusively.

It is not believed in manufacturing circles in Worcester, Mass., that the Norton Emery Wheel Company will be persuaded to sell their business to the proposed consolidation. They are a very close corporation. There are really only seven holders of the \$306,000 of capital stock. They are Milton P. Higgins and family, 1305 shares; George I. Alden and family, 645 shares; Fred. H. Daniels, general engineer of the American Steel & Wire Company, 300 shares; H. A. Young, 300 shares; John Toffin, 240 shares; Charles L. Allen, 210 shares, and George T. Smith, 60 shares. None of the stock is ever in the market, but it is regarded as being worth several hundred dollars a share. The company are building a considerable addition to their plant at Niagara Falls, N. Y. The new portion of the building will be entirely fire proof and will contain additional electric furnaces for the production of artificial corundum, the demand for which has greatly increased since the Niagara Falls plant was established two years ago.

T. M. Boggs of Monongahela, Pa., whose foundry in that city was recently destroyed by fire, has bought ground adjoining the plant of the Monongahela Foundry & Forge Company and formed a company to build a foundry and machine shop to manufacture hoisting engines and equipment for mines.

Business at the Barbers Crossing plant of the Plunger Elevator Company, Worcester, Mass., has become brisker since the announcement of the establishment of the Standard Plunger Elevator Company. The Otis Elevator Company, who own the Barbers Crossing business, are now rushing plunger elevators. It is said among the elevator men. Previously the Otis people had been booming their other types of lifts.

The International Power Company have a small force of workmen at the old shops of the Wheelock Engine Company, in Worcester, Mass., and machinery is running after several years of idleness. Parts of the Diesel combustion engine are being

manufactured, and the Merritt air brake department of the company will begin manufacture as soon as the financing of this integral part of the International Company is completed.

The United States Stamping Company of Moundsville, W. Va., have decided to increase their capital stock from \$100,000 to \$200,000, \$50,000 of which will be retained as treasury stock, \$25,000 offered to stockholders, pro rata, at par, and \$25,000 distributed to stockholders as a stock dividend.

The Deming Company of Salem, Ohio, manufacturers of pumps, are completing two additions to their plant. The main building is 226 x 86 feet, and the second building connects the former with the company's office building.

The American Drill Company, heretofore of Springfield, Ohio, will erect a plant at Sandusky, Ohio. J. W. Sharick, James Homan and Allen Thomas of Sandusky are at the head of the company. The company have been manufacturing goods in a small way for about two years, but the business has so increased that a large factory is necessary.

The Pittsburgh Engineering Company of Pittsburgh, who have existed for some time as a partnership, have been incorporated with a capital of 125,000, and the following officers elected: Guy P. Thurber, president; Lawrence R. White, vice-president; H. L. Kerr, secretary; John Stewart, treasurer.

The Phillips Mine & Mill Supply Company of Pittsburgh have completed a very large addition to their plant on the South Side. The building is of brick and steel construction, 100 x 120 feet in dimensions, and contains two stories and basement. It is connected with a smaller building, which will be used as a blacksmith and bending department. By this addition the company will double their capacity for the manufacture of mining machinery.

The National Drill & Mfg. Company, who are erecting a plant at Barberton, Ohio, will make additions to their machine shop and forging departments, already under way. The company will manufacture drilling and oil well machinery, and the plant will be in operation in about 60 days.

The William Tod Company of Youngstown have received one of the largest planers ever built. It is 14 feet wide between housings, 12 feet high from the table to the cross rail, has a 30-foot bed and weighs 500,000 pounds. The tool was built by the Pond Machine Tool Company, at Plainfield, N. J., and is said to have cost about \$30,000.

The Richardson-Oliver Company, Athol, Mass., a consolidation of C. F. Richardson & Son and the Oliver & Whitney Company, will shortly install eight new automatic screw machines in the Richardson plant, where the equipment from the Oliver and Whitney Company is being installed. They are also putting in an additional 25 horse-power engine. The company manufacture transits, iron levels, set, cap and machine screws.

The National Machinery Company of Tiffin, Ohio, manufacturers of nut, bolt and wire nail machinery and spike machines, have just shipped two of their hand feed spike machines to Scotland. The demand for machines for making the standard U. S. railway spike has greatly increased in foreign lands, and the company are enjoying a good foreign and domestic trade on these tools.

The Snyder-Hughes Company of Cleveland, manufacturers of steam pumps, are now settled in their new plant on Sheridan street and the Pennsylvania railway, that city. The new plant covers 2½ acres and comprises four buildings—an office building, machine shop, pattern shop and power plant. Plans are being prepared for a large foundry, which will be erected in the spring.

The Columbus Screw & Machine Company of Columbus, Ohio, have been incorporated with \$15,000 capital stock and the following officers have been elected: J. T. Ferrel, president; O. V. Kunn, vice-president; J. B. Foster, secretary-treasurer. The company propose to manufacture screws and screw machinery. The organization is on the co-operative plan, and the stock is to be divided among employees and other workers, no one man to be allowed to control the majority of the stock. They will commence work at once on a factory which will be completed by March 1.

The Frick Mfg. Company, Waynesboro, Pa., have successfully tested and will now place on the market what will be known as the quadruple stage air ice machine, invented by Leicester Allen, who holds a position in the drafting department of the company. As the name implies, it differs radically from other ice machines. Air and steam are used in the machine instead of ammonia and steam. It is intended largely for marine use in order that the danger from chemicals, which are a constant menace to steamers, may be avoided. The air machine will not be used on land in competition with ammonia machines except for special purposes. The cost of production is said to be slightly greater than by the ammonia method.

The Globe Light & Power Company, care of R. H. Quincy, San José, Cal., who recently purchased a water right, are now working on the flume and will not be ready to purchase the electric equipment for the power house for several months.

The Giddings & Lewis Mfg. Company, Fond du Lac, Wis., manufacturers of saw mill machinery, are building a new plant with treble their present capacity, which they expect to occupy next summer. The company are meeting with great success in the sale of their horizontal band resawing machine, which is claimed to be the only one manufactured in this country.

The Indianapolis Drop Forging Company, Indianapolis, Ind., report themselves flourishing in spite of the harassments of a nine months' strike by machinists, because the work of one of them, who was a die sinker, was not found satisfactory as a machinist, and he was discharged. The company have filled the strikers' places and are now filling their orders, though not with the usual promptness. The company have been for some time back to normal conditions, however, and are caring for all orders that come. They have large customers in New York, Chicago, St. Louis and other cities, and there is scarcely a metal manufacturing concern in Indianapolis that they do not do work for. The product is exclusively drop forgings.

The large plant of the Steel Car Forge Company, at Ellwood City, Pa., is being increased in capacity by the erection of three buildings, after designs by Armin Schotte, mechanical and consulting engineer, of Pittsburgh. The boiler house, 50 x 80 feet, will contain five boilers; main building, 80 x 300 feet, will contain new forging machinery, and the stock house, 50 x 150 feet, will contain added material for the works. John Elchleay, Jr., Company, are erecting the plant, which will likely be finished by March 1.

Power Plant Equipment.

The Mack Kinnon Mfg. Company, Bay City, Mich., have just sold two tubular boilers, 6 feet diameter, 16 feet long, complete with fixtures and fittings and erected in power house, for the Pittsburgh Coal Company and the Wenona Coal & Mining Company, Bay City: one tubular boiler, 54 inches diameter, 15 feet long, for Cheshbrough Brothers of Eckerman, Mich.; also two storage tanks, each 22 feet diameter, 16 feet 6 inches high, for the Solvay Process Company, Detroit, Mich., and 450 tons cast columns for a beet sugar house, furnished to the Kilby Mfg. Company, Cleveland, Ohio.

Kenney & Co., manufacturers of engines, boilers, coal mine and coke oven machinery, Scottdale, Pa., announce that they have recovered from their disastrous fire of October 11, 1901, which was complete in its scope and totally destroyed the factories and appliances. The works have been rebuilt on much enlarged and more modern scale, and have been equipped with the latest and most modern tools and appliances obtainable. This company were established in 1880 and incorporated in 1901 under the laws of the State of Pennsylvania. The officers of the company are as follows: A. K. Stauffer, president; E. L. Rutherford, vice-president; D. B. Stauff, secretary; W. F. Stauffer, treasurer; T. C. Kenney, general manager.

The Susquehanna Iron & Steel Company of Columbia, Pa., are about to install an electric power distribution plant in their mills. A recent purchase from the Westinghouse Electric & Mfg. Company comprises a 400 kw. alternating current generator, one 200 horse-power induction motor and 300 to 400 horse-power in motors, ranging in size from 50 to 20 horse-power.

The Anaconda Copper Mining Company are about to put in operation a new 5000-ton per day reduction plant, which will be equipped with electrical apparatus for power distribution. The electrical contract awarded to the Westinghouse Electric & Mfg. Company includes seven motors of an aggregate of 185 horse-power, to be added to the present installation of about 30 Westinghouse motors of an aggregate of over 1000 horse-power.

The Marinette Iron Works, Marinette, Wis., report the receipt of an order by cable from Portugal for a 12 horse-power Walrath gas engine. The order comes as a sequence to the shipment of four other similar engines—one 10, one 6 and two 20 horse-power direct connected generating sets. Sales have been made through the company's agent at Lisbon.

The Whitehead Machinery Company, Davenport, Iowa, have purchased the entire present power plant of Slater Cotton Company, Pawtucket, R. I. The equipment, which will remain in service four or five weeks, comprises 300, 400 and 750 horse-power Corliss engines, Babcock and Wilcox boilers, large tubular boilers and usual accessory machinery. The purchasers will offer the property for sale.

The Southern Engineering Company, Jennings, La., desire proposals and suggestions for a power plant to pump three flowing artesian wells, each to furnish a 9%-inch stream, and allowing a fall of water of 15 feet in dry weather. It is desired that the wells be as far apart as possible and that they may be worked to their full capacity. Good and economical machinery is wanted. A. Meurer is president.

The Ironton Engine Company, recently organized at Ironton, Ohio, have secured a site and will soon commence building their new plant.

J. P. Slaughter, chairman Finance Committee, Burlingame, Kan., writes us that the equipment for the \$10,000 municipal

electric light plant has been secured. The Murray Iron Works of Des Moines, Iowa, will furnish the boiler and engine, and the Western Electric Company of St. Louis, Mo., a Warren alternator.

A new power plant will be erected at the Defiance, Ohio, plant of the Diamond Glass Company of Cleveland. A building 75 x 126 feet will be erected and an engine, generator, boilers and other machinery will be installed.

The India Rubber Company of Akron, Ohio, manufacturers of mechanical rubber goods and rubber specialties, are preparing plans to more than double the capacity of their plant in Akron. Among other buildings there will be a large power plant.

The foundations of the plant for the recently organized Standard Engineering Company, at Ellwood City, Pa., are now being put in. This will be one of the most important plants at Ellwood City and will build gas engines and machinery of different kinds.

Sinker & Davis Company, Indianapolis, Ind., express their pleasure at the way 1903 has begun. Early trade, the company say, points to increased activity in the lumber business. The company's specialty is the making of machinery for hard wood mills. They began operations in Indiana when the State was the center of the hard wood industry in this country.

The title of the Gray-Blaisdell Company, Bradford, Pa., will shortly be changed to the Blaisdell Machinery Company. They are going extensively into the manufacture of gas engines and in furtherance of this expect to erect a foundry in the spring.

The Ironton Engine Company, recently organized at Ironton, Ohio, have secured a site of 12 acres on which they will erect a new plant as fast as possible, and which they expect will be partly in operation by June 1. The company will manufacture the Allfree automatic and expansion engines. J. Allfree is president.

Foundries.

At the annual meeting of the C. L. Darer Foundry Company, Bellaire, Ohio, held last week, James Weeks was elected president, S. Wimmer vice-president, Carl Darer secretary and treasurer, and Clarence Simpson general manager.

The stockholders of the Youngstown Bronze Company, Youngstown, Ohio, at a meeting last week decided to proceed with the erection of a new plant, consisting of brick foundry building, 85 x 150 feet, including two cupolas, one for iron, one for brass and bronze, and a machine shop, the dimensions of which have not been decided upon. At the election of officers the following were chosen: Grant Jones, president; W. H. McMillan, secretary and treasurer; J. W. Long, manager. The Youngstown Bronze Company were incorporated in 1902, and so rapidly has their business grown that the improvement decided upon is imperative.

The Wellman-Seaver-Morgan Engineering Company of Cleveland have placed in operation their new steel castings foundry, which has been erected as an adjunct to their large plant erected in Cleveland last year. They are now prepared to furnish steel castings up to 40,000 pounds.

The Duplex Mfg. Company, who are erecting a plant at Elyria, Ohio, for the manufacture of steel draining supplies, have established a purchasing office in the New England Building, Cleveland. They will erect a foundry, 70 x 140 feet, and another building may be added.

The Riter-Conley Mfg. Company of Pittsburgh have a contract for the structural work for the new building of the Sharon Foundry Company, at Wheatland, Pa., and which will be 45 x 120 feet. The concern will manufacture heavy castings and ingot molds and expect to be ready for operation in April.

The American Ship Windlass Company of Providence, R. I., are to build a foundry, 55 x 155 feet, with a capacity of 10 tons a day. The structure will be of brick and will adjoin their present factory on the Providence side of the Seekonk River, near Red Bridge. The equipment has not been purchased. F. P. Sheldon of Providence is the engineer. The officers of the company are: Frank S. Manton, president and manager; H. O. Swan, secretary and treasurer.

Walker & Pratt of Watertown, Mass., are preparing to build an addition to their foundry warehouse. No new machinery will be required.

The American Steel Casting Company of Chester, Pa., have made two large shipments of locomotive castings to Altoona.

The Lansing Foundry Company, Lansing, Mich., have been incorporated with a capital of \$20,000, the incorporators being Leonard W. Roe, A. F. Molitor, E. H., Louis R. and Otto E. Broadhay. The company have purchased the foundry plant of Molitor, North & Moyers, and will carry on a general foundry business, manufacturing all kinds of gray iron castings. The plant will be increased as necessity demands.

The Pennsylvania Trust Company, receivers of the Central Foundry & Machine Company, of Reading, Pa., will, pursuant to the order of the Berks County courts, offer at public sale on

Saturday, February 4, the plant of the company. The receivers have failed to make the business pay and will sell for the benefit of the creditors.

At the annual meeting of the stockholders of the Wheeling Mold & Foundry Company, Wheeling, W. Va., held on January 22, the following Board of Directors was elected: C. E. Blue, B. W. Peterson, Joseph Speidel, L. V. Blue, Alex. Glass, W. B. Jones and George A. Laughlin. This company are putting up a pattern storage room, which will include warehouse for miscellaneous supplies.

The McNamara-Koster Foundry Company, Indianapolis, Ind., say there is no let up in the demand for foundry work, and the behind orders condition that existed last year continues in the foundry business generally in this city. This company do general jobbing work, having the patronage of the large iron works, the electric and automobile and other like concerns of city and State. The company confess their inability to keep up with the demand, but they have not room for another man in their present quarters and are driven to make extensive additions this year, which will be begun in the spring.

Fires.

The power plant of the Steubenville Traction & Light Company, Steubenville, Ohio, was badly damaged by fire last week. The roof and walls fell in, almost ruining the large engines and generators. The plant furnished power for city lighting, as well as for two traction systems. A temporary station will be fitted up as soon as possible, until the plant can be rebuilt.

The new factory of the Findlay Novelty Works, at Findlay, Ohio, was damaged by fire January 17. The loss in machinery and tools was about \$3000. The owners will rebuild at once.

Hardware.

The A. Dudley Mfg. Company, Menominee, Mich., have recently added considerable new machinery to meet the increasing demand for their product, particularly for their line of combination wrenches and pipe wrenches.

The Foot Mfg. Company, Jersey City, N. J., are doing an increasing business each year in polishers' and platers' supplies, which goods, we are advised, are being used in many of the largest shops in the country.

The J. B. Foot Foundry Company, Frederickton, Ohio, have within the last 18 months entered new patterns throughout for their farm, school and church bells; also for Nos. 3 and 4 hollow augers and the landing saw vice patterns on the market. They have increased their foundry facilities to nearly twice their former capacity, and are now prepared to supply the wants of the trade.

Plans are being made for an extension to the plant of the Bryden Horseshoe Company at Catasauqua, Pa. The building used as a storehouse will be enlarged by a second story and will be used for the foundry and machine department. A new storehouse will be erected.

Miscellaneous.

The Dublin Wagon & Machine Company, Dublin, Ga., recently incorporated, propose to manufacture wagons, buggies and farming implements. Special attention will be given to the wagon business. A new plant is to be erected, and J. F. Murchison, the president of the company, and J. B. Williams, the secretary and treasurer, are purchasing the machinery needed.

The old and well-known firm of Theodore Hertz & Son of St. Louis, Mo., have recently changed their style of title and are now known as the Theodore Hertz Metal Company. They will continue the business at the old address, Tenth and Poepling streets, St. Louis, Mo., as smelters and refiners of ore, dross and metal. They are large producers of linotype, stereotype, electrotype and several special grades of anti-friction metal and solder.

The Penn Gas Coal Company have decided to remove their car shops from Penn Station to Irwin, Pa. The shops at Penn Station have been in operation for about 30 years and are too small to meet the requirements of this concern for cars. The new shops at Irwin will be about twice the size of the present shops.

The Worcester Umbrella Company, Worcester, Mass., have voted to increase the capital stock from \$20,000 to \$40,000, in order to take care of the rapid increase in business. The company have been doing business only nine months, but their success has been great. The officers are: President, Harlan P. Duncan of the Duncan & Goodell Company, hardware dealers; vice-president and clerk, Joseph A. Jones, who is also the manager; treasurer, A. H. Howard of the Howard Bros. Company, card clothing manufacturers; directors, these officers, and A. W. Parmelee, president of the Wire Goods Company.

The Globe Corset Company of Worcester, Mass., have voted to increase the capital stock from \$150,000 to \$250,000, one of the purposes of the new capital being to erect a large addition to the factory and add a lot of new machines.

The Worcester & Northern Street Railway Company have been given the location for a cable road up Mt. Wachusett and will build this spring and summer. The line will be a little more than $\frac{1}{4}$ mile long, with an average grade of 36 per cent. It will be double track, of the same counterweight system as that used on Mt. Tom, in the Connecticut Valley.

The United States Circuit Court, sitting at Boston, has issued a permanent injunction against the firm of E. J. Somers & Co. of Worcester, tack manufacturers, restraining them from manufacturing wire shoe nails with clinching points, and in a trade-mark case accompanying the patent litigation, from using a trade-mark for the same nails. The plaintiffs in the case are the firm of Charles E. Baker & Co. of Boston.

The Standard Pressed Steel Company, with offices at Ogontz, Pa., and chartered during the past week, have organized by the election of Howard T. Hallowell, Thomas Thomson and H. K. Taylor as directors. The directors have elected Thomas Thomson treasurer. The amount of the capital stock is \$50,000.

The Ohio Stone & Paving Company of Youngstown, Ohio, are manufacturing hollow building blocks made of cement.

The United States Blow Pipe & Hydraulic Works, Seattle, Wash., are erecting new shops and warehouses. They have purchased their machinery equipment.

A company are being organized at Wheeling, W. Va., to manufacture the Davies car wheel. Until the new plant is erected the wheels will be made by the Wheeling Mold & Foundry Company of that city.

The Pressed Steel Car Company of Pittsburgh have secured a contract for 500 steel hopper cars from the West Side Belt Line.

The annual meeting of the Washington Coal & Coke Company was held last week at the general offices of the company, at Dawson, Pa., and resulted in the election of the following: M. M. Cochran, president; W. Harry Brown, vice-president; J. H. Wurtz, secretary and treasurer; J. S. Newmyer, Nelson A. Rist, A. C. Sherrard, J. C. Core and E. J. Taylor, directors. At the same time the annual meeting of the Washington Run Coal Company was held. This company are controlled by the Washington Coal & Coke Company and operate a railroad used for delivering coal from the mines to the Baltimore & Ohio Railroad. This company's election resulted as follows: W. Harry Brown, president; M. M. Cochran, vice-president; John H. Wurtz, secretary and treasurer; John S. Newmyer, general manager and superintendent, and W. Harry Brown, M. M. Cochran, John H. Wurtz, J. S. Newmyer, E. J. Taylor, Nelson A. Rist, J. C. Core, Alex. C. Sherrard, directors.

The Climax Tag Company, now located at 19-25 Keowee street, Dayton, Ohio, manufacturers of cotter pins, flat spring keys and flat riveted keys, have installed special automatic machinery for the manufacture of special wire shapes and are prepared to receive samples of any desired shape for estimate. They report an excellent demand for their other specialties and would be pleased to send their catalogue to those interested.

The Pittsburgh Railways Company, operating all the electric street car lines in Pittsburgh and vicinity, have placed a contract for 100 cars.

The Pittsburgh Valve & Fittings Company, who have partially completed the erection of a large plant at Barberton, Ohio, have decided to add two more buildings to those already under way. They will be about 200 x 50 feet each. The foundry department of the plant will be in operation about February 1, and the entire plant will be in operation with a force of 1500 men by next September. They will manufacture valves, steam fittings and iron pipe.

The Cleveland Automatic Stoker Company of Cleveland have been incorporated under the laws of New Jersey, with \$200,000 capital stock. Incorporators: Wm. F. Malone, Frank Gorman, Charles R. Clapp and others. They will erect a plant for the manufacture of a new automatic stoker. Several Toledo people are interested in the project, but the plant will be in Cleveland.

The Pittsburgh Steamship Company of Cleveland, who operate the Great Lakes fleet of ore carriers owned by the United States Steel Corporation, have let the contract for the remodeling of 40 of their vessels to accommodate the unloading by clam scoops now in use. This will enable 90 to 95 per cent. of the cargo to be removed by machinery. In addition to this 17 of the whalebacks are to be equipped with loading machinery of the latest improved designs. The work is to be completed before the opening of navigation and will cost \$120,000.

Under plans prepared by O. H. Jewell of Chicago, the water works department of Lorain, Ohio, will spend \$10,000 in improvements to the filtering and pumping systems. The improvements will be made as soon as possible.

The Hitchcock Supply Company, Springfield, Mass., are installing two new Saunders pipe cutting machines and a Brighton gas engine. They expect in the near future to put in another Saunders machine. The company have purchased a lot, 50 x 100 feet, upon which they intend to erect a building for their steam fitting supply business, and are preparing to cut all sizes of pipe and to carry mill supplies.

The Geneva Automobile & Mfg. Company of Geneva, Ohio, have increased their capital stock from \$100,000 to \$150,000 and will erect an addition. J. A. Carter is president and manager.

The American Ball Bearing Company of Cleveland, manufacturers of ball bearings, wagon and automobile hubs, have

increased their capital stock and are planning the erection of a large addition with which to take care of their increased business. Walter Baker is president, and Philip Dorn general manager of the company.

The Champion Elevator Gate Company, recently incorporated with a capital stock of \$100,000, have succeeded the Fort Worth Automobile Gate Company, Fort Worth, Texas, who have been manufacturing the McNaught automatic elevator gate for the past year. The company have a number of orders on hand and may enlarge the plant.

The Baldner Automobile Company have organized at Xenia, Ohio, and have purchased a factory building in that city which will be equipped for the manufacture of automobiles. The output will be several automobiles per day. It is the intention to erect a foundry to produce their own castings.

The recently incorporated Hedden Iron Construction Company of Newark, N. J., have purchased the plant and business of Eugene B. Hedden, Newark, N. J., engineers and contractors. The officers are: Eugene B. Hedden, president; Ernest A. Barker, secretary, and William A. Klusey, treasurer.

The Wolfe & Warnke Company of Toledo, Ohio, were incorporated last week with \$10,000, by G. H. Wolf, H. C. Warnke, A. H. Merrell and George D. Marquette. The company absorbed the firm of Wolfe & Warnke, who manufactured galvanized iron cornices. They have a number of large contracts for roofing and cornices and will enlarge their plant to take care of the increased business.

W. B. Scalfe & Sons Company of Pittsburgh, with works at Oakmont, Pa., have recently received some large and important orders for steel frame construction that will compel them to run their works overtime for some weeks in order to make deliveries within the time required by the contracts. The statement that they would operate their works all night is incorrect, as they are averse to running their plant at night, believing they obtain far better results by working in the daytime only.

The Standard Dry Kiln Company, Indianapolis, Ind., whose system includes the use of steam pipes, have had a hustling year, increasing largely the volume of their trade, though their profits were cut into by the necessities of keen competition. The outlook is good, they say.

The Pioneer Brass Works have just completed the second year in their modern plant in South Pennsylvania street. They occupy buildings 82 x 150 feet and are the largest industry of the kind in the State. The company were entirely satisfied with 1902, for their business was slightly larger than in 1901 and the profits better on account of a lower range of prices for raw material. Their principal work is job castings, but they do some plumbing work for Indiana's prominent supply houses. They have a large patronage from the leading engine and boiler makers, the automobile and electrical manufacturers of Indiana and other States.

Langsenkamp Bros.' Brass Works report trade in a healthy condition and no indication of it growing less so long as prosperity attends the iron industries upon which the jobbing brass manufacturers depend.

Parkhurst Bros. Mfg. Company, Indianapolis, are the only builders of elevators in Indiana. They have a large and growing business both at home and abroad. Among recent shipments are: Two freight and one passenger elevators to Frank W. Bell and E. B. Welch, El Paso, Texas; two freight machines to Columbus Iron Works, Columbus, Ga.; one to the Columbus Bolt Works, Columbus, Ohio; one to Wilson & Craig, Bristol, Tenn.; two to the Kalamazoo Foundry & Machine Company, Michigan; two electric machines to the Moore-Edenfield Electric Mfg. Company, Augusta, Ga., and others. While freight elevators are the company's specialty, they also make passenger machines speeded to 125 feet.

The Woodward & Powell Planers.

The Woodward & Powell Planer Company, Worcester, Mass., are completing a big planer for the Pennsylvania Railroad's shops at Altoona, Pa., to be used for planing the ends of locomotive connecting rods. The planer is said to be the largest of its type ever built, and in addition it contains a number of new features of mechanical movement. The machine has eight cutting heads. One set of housings is fixed like that of any metal planer, while the other set is movable and can be moved back and forth to plane the different lengths of connecting rods. The problem to be solved was to arrange the feed of the two heads on each cross rail and the head on each housing, to work in unison. This was easily arranged on the fixed housings, but on the movable housings it was a serious problem. It was mastered by A. M. Powell, president and superintendent of the company, after long and patient study. This machine will plane both ends of two connecting rods simultaneously.

Another order for two of these machines has just been placed with the Woodward & Powell Company

by the American Locomotive Company for their Dunkirk works. Two electrically driven planers are building for the General Electric Company for the steel foundry of their Lynn works, to plane sprues or risers from steel castings. Apart from the electric drive these planers are of the frog or switch planer type, and they are probably the most powerful machines of their class ever built. The company have built a great number of this class of planers and some of the larger makers of track equipment each have from 15 to 30 of them in operation.

This new machine is massive in its construction. Its heavy platen, or table, is gibbed to the bed plate to keep it from rising, as is often the case under the excessive strain caused by the cutting tool. All the gears that transmit the power to the platen are of steel. The machine sends its cutting tool plowing through hard steel with perfect ease and has an excess of power beyond the cutting capacity of the tool. On soft, mild steel each of the two heads can easily take a chip one-eighth feed and 2 inches deep.

Another of the Woodward & Powell Company's large orders is for the Huber Hodgeman Printing Press Company's new plant. There is much demand for the company's electrically driven planers, which have the motor on the top of the housings and attached, connected with a countershaft which is also attached to the housings. Mr. Powell is now working on a new planer to be electrically driven, in which belts will be done away with altogether. The new Powell planer will more nearly comply with the present demands made necessary by the use of the new high speed tool steels.

PERSONAL.

Frederic P. Dewey, the well-known chemist and metallurgist of Washington, D. C., has been appointed Assayer to the Mint Bureau.

John Stevenson, Jr., of the Sharon Steel Company, at Sharon, Pa., will soon sail for Europe on an extended trip.

Frank L. Clark, president of the Alabama Tube & Iron Company, Birmingham, Ala., was a visitor in Pittsburgh last week. Mr. Clark was in that city for the purpose of securing skilled labor, which he reports to be very scarce in the South. He states that their plant, which manufactures cotton ties and small iron bars, is running to full capacity, with plenty of orders ahead.

Alfred Nobie has been elected president of the American Society of Civil Engineers. He is chief engineer of the easterly section of the Pennsylvania Railroad's New York terminal work.

S. P. McConnell has been elected to succeed H. S. Black as president of the George A. Fuller Construction Company.

E. G. Spilsbury, consulting engineer, of New York, sailed for Europe last Saturday. It is probable that after being in Germany for some time he will go to Sicily.

The New Castle Forge & Bolt Company, New Castle, Pa., have elected C. J. Kirk to the office of treasurer.

Frank C. Neal, sales agent of the Carnegie Steel Company, has been elected president of the Kittanning Iron & Steel Company, Kittanning, Pa., to succeed his father, who died recently.

George W. Todd has been elected vice-president and general manager of the Diamond State Steel Company of Wilmington, Del.

Recently the United States Steel Corporation requested the Pittsburgh & Lake Erie Railroad to put forth an extra effort to aid the Edgar Thomson furnaces in maintaining a sufficient supply of coke. The Frick Coke Company, a constituent concern, lent assistance by placing a number of cars at the railroad's disposal, and by facilitating the loading at the coke plants. As a result the Pittsburgh & Lake Erie took these cars and made 12 round trips with them in 17 days, working between Bessemer and the Connellsville district.

The Iron and Metal Trades.

From all the leading producing points come the old complaints, in an intensified form, of trouble with shipments of raw materials and of product, and until there is relief in that matter, natural causes, which seem to point to lower values, cannot be expected to gain sway.

There are indications that the deadlock between buyers and sellers of Pig will soon come to an end. On both sides important interests are growing restive. While the movement has not yet developed, it has begun. There have been sales of foreign Foundry Irons and of Bessemer Pig, aggregating about 15,000 tons, in cargo lots, Middlesbrough No. 3 selling at \$17.75 to \$18. It appears that a leading Steel interest has bought quite heavily of Basic Pig Iron at a shade under \$20, delivered, well into the second half of the year.

The movement of Bituminous Coal from British and Canadian to New England ports has developed into large proportions during the last two weeks and is affecting the ocean freight market.

Reports from the Cast Iron Pipe industry are very encouraging, the works being in receipt of orders and of inquiries far larger in volume than is usual at this early period in the year. It is a tradition in this branch that while it is last to feel the effects of good times, it enjoys their fruits after others are witnessing an ebb in the demand.

There has been a revival of interest in foreign Steel, and some business has been put through during the past week. There is still some foreign Steel, now afloat, for sale at a concession, but the primary markets are firmer and \$27, ex-ship, for Blooms and \$27.50 for Billets are the lowest prices at which German Steel is offered. Canadian Open Hearth Steel is held at a higher price.

Our Pittsburgh correspondent alludes to some interesting developments which bear upon the question of the Steel supply for the independent Sheet and Tin Plate works of the Central West. The report is to the effect that the Clairton Steel Company, an allied interest of the Crucible Steel Company of America, may install a Bessemer plant and Bar mills at Clairton. The question is also under consideration of erecting a new Bessemer plant at Youngstown, Ohio.

The Eastern Bar Iron makers at a recent meeting came very near advancing prices, and it seems probable that if present conditions continue to prevail the higher values will soon be established. Pittsburgh and Chicago report quite an active market in Bars, the business in the latter district being stimulated by the prospect of a consolidation of the outside mills.

In the Wire industry arrangements have been perfected by which co-operation in the export trade, under the management of the leading interest, is assured.

There has been some inquiry for foreign Structural Material for outlying points and it seems that business may be put through if shop work abroad can be arranged for.

As affecting, at least temporarily, the supply of Old Material, it is of interest to note that one of the largest trunk lines has ordered the stoppage of accumulations for monthly disposal, because cars and men cannot be spared to collect, assort and ship the material.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Jan. 28, 1903.	Jan. 21, 1903.	Dec. 31, 1902.	Jan. 29, 1902.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	\$22.25	\$22.25	\$22.75	\$17.00
Foundry Pig No. 2, Southern, Cincinnati	21.25	21.75	21.75	14.75
Foundry Pig No. 2, Local, Chicago	22.50	23.00	23.00	16.00
Bessemer Pig, Pittsburgh	22.85	21.85	21.85	16.75
Gray Forge, Pittsburgh	20.50	20.50	20.00	16.00
Lake Superior Charcoal, Chicago	26.50	26.50	25.00	19.50

BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	30.00	29.50	29.50	28.50
Steel Billets, Philadelphia	*27.00	*26.50	*27.00	29.50
Steel Billets, Chicago	30.00	30.00	*29.50
Wire Rods, Pittsburgh	35.50	34.50	34.50	35.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:				
O. Steel Rails, Chicago	18.00	18.50	18.75	15.00
O. Steel Rails, Philadelphia	20.75	20.75	21.00	18.50
O. Iron Rails, Chicago	24.00	24.00	24.00	22.00
O. Iron Rails, Philadelphia	23.50	23.50	24.00	21.00
O. Car Wheels, Chicago	24.00	24.00	24.00	16.50
O. Car Wheels, Philadelphia	20.50	20.50	20.00	17.00
Heavy Steel Scrap, Pittsburgh	21.00	21.00	21.50
Heavy Steel Scrap, Chicago	18.00	18.00	18.25	14.00

FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.93½	1.93½	1.92	1.67
Common Iron Bars, Chicago	1.75	1.81½	1.75	1.75
Common Iron Bars, Pittsburgh	1.80	1.70	1.70	1.50
Steel Bars, Tidewater	1.75	1.75	1.75	1.62
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater	2.10	2.10	2.10	1.78
Tank Plates, Pittsburgh	1.75	1.75	1.75	1.60
Beams, Tidewater	1.75	1.75	1.90	1.75
Beams, Pittsburgh	1.60	1.60	2.00	1.60
Angles, Tidewater	1.75	1.75	1.90	1.75
Angles, Pittsburgh	1.60	1.60	1.90	1.60
Skelp, Grooved Iron, Pittsburgh	1.90	1.90	1.90	1.70
Skelp, Sheared Iron, Pittsburgh	1.95	1.95	1.95	1.75
Sheets, No. 27, Pittsburgh	2.65	2.65	2.65	3.00
Barb Wire, f.o.b. Pittsburgh	2.50	2.50	2.45	2.90
Wire Nails, f.o.b. Pittsburgh	1.90	1.90	1.85	2.00
Cut Nails, Mill	2.10	2.10	2.05	2.05

METALS:				
Copper, New York	12.37½	12.15	11.87½	11.75
Spelter, St. Louis	4.80	4.80	4.35	4.10
Lead, New York	4.10	4.10	4.10	4.10
Lead, St. Louis	3.97½	3.97½	3.97½	4.00
Tin, New York	29.10	28.00	26.50	23.50
Antimony, Hallett, New York	7.00	7.00	7.12½	8.00
Nickel, New York	40.00	40.00	40.00	50.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York	3.79	3.79	3.79	4.19

* Foreign.

Chicago.

FISHER BUILDING, January 28, 1903.—(By Telegraph.)

Information is received that during the last 24 hours large buyers are again testing the market for Pig Iron for the second half of the year, and in one case at least several hundred tons of Northern Iron have been sold on the basis of \$23 for No. 2 for that delivery. It is believed that other buyers who usually buy in large quantities are seriously contemplating covering a considerable portion of requirements for the second half. The other buyers, however, seem merely to be taking the temperature of the furnaces, without any intention of immediate purchases. It cannot be doubted that the rank and file of buyers are still utterly indifferent to what the second half of the year may have in store. The volume of business for the first half has continued very light. One furnace has blown out and another blown in during the past few days, making little change in the general outlook. One feature of interest has been the revival in the demand for Bar Iron, railroads and wagon manufacturers making larger purchases than for many days, not only for prompt shipment, but for delivery extending as far forward as October. It may be that the contemplated merger of the independent Bar mills may have caused a quickening in trade currents. Many mills are closed, which gives additional tone to the market. Structural Material, including Plates, is attracting considerable attention, although the volume of business has not been large. One of the principal orders during the week has been the covering of contracts for the construction of quite a number of railroad cars. Light Rails have sprung into activity, the local mills having taken considerable tonnage recently. It is significant that manufacturers of Cast Iron Pipe have dropped prices \$1

per ton, with the tendency still downward. The lower prices have resulted in some increase in business and it is probable that municipalities may be encouraged to enter the market more freely by this action. It is worthy of note that manufacturers of Wire and Wire products have booked very heavy orders during the month of January, notwithstanding the heavy business secured during the last month of last year. There is a growing inquiry for Sheet Bars and Wire Rods in this vicinity, but the high prices have checked business of any importance. Billets continue to be neglected. News from the Connellsville district is very discouraging to consumers of Coke. About 75,000 tons of Coal and Coke are said to be on cars in the region of the ovens, with little prospect of relieving the congestion. A feature of interest is the continued strength and activity in Copper, Lead and Spelter, larger contracts being reported, with the tendency of prices still upward. The demand comes mainly from the East.

Pig Iron.—The character of the Pig Iron market has not changed essentially during the week. The volume of business has been light and the fluctuations in prices have been narrow. Even the large buyers who have been testing the market heretofore seem to have disappeared. Transactions have continued to be confined to a few 100-ton lots, even 500-ton transactions being rare. Malleable Iron foundries have continued to buy from hand to mouth of Standard Bessemer for quick shipment, but the market for Charcoal Iron seems to have passed beyond their range. Probably the largest buyers of the week have been stove foundries, who have purchased in the aggregate a little over 500 tons. Much difficulty is still reported in obtaining ample Coke supply, large consumers—both furnaces and foundries—being compelled to purchase in the open market to eke out a sufficient quantity to keep furnaces and cupolas in blast. Some sales of local Coke Foundry have been made at prices lower than those quoted a week ago, placing Northern brands more nearly on a level with Southern make in this market. Small lots of Southern Silvery have been sold on the basis of quotations. Among the sales may be noted single carload lots of Lake Superior Charcoal at about \$27.50, No. 2 Foundry Local Coke at \$22.50, No. 3 ditto at \$22, 300 and 250 tons of No. 2 Southern Coke on the basis of \$18.50 and 200 tons ditto on basis of \$18, Birmingham, for delivery beginning in February, extending forward several months, while other 100-ton lots of Southern Coke, No. 2 Foundry, have brought as high as \$19. Several hundred tons of Standard Bessemer have been disposed of at \$24.30 to \$24.50, Chicago, for delivery during the next few months. Single car lots of No. 2 Local Iron have been sold as high as \$25 and foreign Iron at \$24 to \$24.50, duty paid, spot track. It will be observed that none of these sales extend beyond the first half of the year. But one lot of 400 tons Northern Iron has been sold on the basis of \$23 for the second half. The following are the prices current for delivery during the first half of the year, the outside prices being obtained for shipments beginning in February. In some instances premiums are obtained over outside quotations for spot delivery, but the tendency is for premiums to disappear:

Lake Superior Charcoal.....	\$26.50 to \$27.50
Local Coke Foundry, No. 1.....	23.50 to 24.50
Local Coke Foundry, No. 2.....	22.50 to 23.50
Local Coke Foundry No. 3.....	22.00 to 22.50
Local Scotch, No. 1.....	24.50 to 25.00
Ohio Strong Softeners, No. 1.....	26.30 to 27.30
Southern Silvery, according to Silcon.....	26.15 to 27.15
Southern Coke, No. 1.....	23.85 to 24.35
Southern Coke, No. 2.....	22.35 to 23.35
Southern Coke, No. 3.....	21.85 to 22.35
Southern Coke, No. 1 Soft.....	23.85 to 24.35
Southern Coke, No. 2 Soft.....	22.85 to 23.35
Foundry Forge.....	21.35 to 21.85
Southern Gray Forge.....	20.35 to 20.85
Southern Mottled.....	19.35 to 19.85
Southern Charcoal Softeners, according to Silcon.....	25.85 to 27.85
Alabama and Georgia Car Wheel.....	28.35 to 28.85
Malleable Bessemer.....	23.00 to 24.00
Standard Bessemer.....	24.00 to 24.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silcon.....	31.30 to 32.30

Bars.—There has been a decided improvement in the market for Bar Iron during the week, sales aggregating upward of 5,000 tons, but scarcely half of this Iron will be disposed of in the Chicago market proper. Deliveries extend forward to July 1, and in one instance as far as October of this year. Prices have been steady, but yet with a hardening tendency incidental to the closing of so many mills for lack of fuel and other causes and the continued scarcity of Scrap. The bulk of the sales have been made on the basis of 1.75c. to 1.80c., Chicago. There has also been an improved demand for Soft Steel Bars, further important specifications on old contracts having been received, and several lots which will probably aggregate 2000 tons have been sold for delivery extending up to July 1. Hoops and Bands have continued quiet, but steady. The following are the prices current for prompt shipment: Bar Iron, 1.75c. to 1.90c.; Soft Steel Bars, 1.76½c. to 1.86½c.; Hoops, 2.06½c. to 2.16½c.; Angles, 1.86½c. to 1.91½c., base, mill shipment. The merchant trade has been moderately active and the market firm: Bar Iron, 2.15c.; Soft Steel Bars, 2c. to 2.25c.; Angles, 2.50c., and Hoops, 2.40c., base, from store.

Structural Material.—Sales during the week have aggregated in the neighborhood of 5000 tons, among the more important transactions being material to cover the construction of 750 cars. There has also been buying of bridge material and small amounts for local construction. Considerable business of importance is pending, including a large office building on the lake front and a warehouse in the business section. The following are the prices current: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. The demand for shipment from local stocks has been fair and the market has continued firm, as follows: Beams and Channels, cut to length, 2¼c. to 2½c.; Angles, 2.25c. to 2.50c.; Tees, 2.30c. to 2.55c., at local yards.

Plates.—The demand has been fair, although no large contracts have been closed, sales aggregating between 4000 and 5000 tons for delivery during the latter half of the year. The following are the prices current: Tank Steel, ¼-inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.10c.; Marine, 2.10c. to 2.20c. The demand has been moderate for shipment from local yards and prices have continued steady, as follows: Tank Steel, ¼-inch and heavier, 2.25c. to 2.35c.; Tank Steel, 3-16-inch and No. 8, 2.30c. to 2.45c.; Flange, 2.50c. to 2.60c., all f.o.b. warehouse, Chicago.

Sheets.—The market has been without special activity, but there has been a good inquiry for Black Sheets, although it has not resulted in very heavy business. The tone of the market, however, is again easier, with keener competition and concessions made in some instances. The following are the official prices for bulk shipments, carload lots, f.o.b. Chicago: No. 20, 2.55c. to 2.60c.; Nos. 22 and 24, 2.60c. to 2.70c.; No. 26, 2.70c. to 2.80c.; No. 27, 2.80c. to 2.90c.; No. 28, 2.90c. to 3c. Small lots from store sell at 15c. to 20c. above mill prices. Galvanized Sheets have been in good demand and prices well sustained at the recent advance for mill shipment. The following are the net prices: No. 27, 3.33c. to 3.60c., and small lots from store at 70 and 7 to 75 and 7½, equivalent to 3.70c. to 3.80c., net, Chicago.

Cast Pipe.—A weaker tone prevails and prices have been reduced \$1 a ton, which has resulted in more contracts. Among the more important sales of the week have been 1800 tons of 6's to 20's sold to Indianapolis, 1000 tons of 20's to 60's and about 1800 tons of smaller sizes for shipment to the Northwest. Railroads and water companies have been the principal buyers. For large quantities it is probable that the following quotations would be shaded. Manufacturers sell, f.o.b. Chicago, 4-inch, \$35; 6-inch, \$34; 8-inch and upward, \$33 for Water Pipe and \$1 per ton higher for Gas Pipe.

Billets.—Very little interest is exhibited by buyers in the local market, there not being enough trading to establish prices on round lots. In a jobbing way domestic Open Hearth Billets are sold at \$36 to \$40, according to analysis, buyer and time of delivery, and Re-rolling Bessemer Billets are nominally quoted at \$30, f.o.b. Chicago.

Sheet Bars.—There is some inquiry for Sheet Bars, which are offered at \$32, but buyers cannot or will not pay the price demanded.

Wire Rods.—A few weeks since Wire Rods were sold in this market at \$34.50 to \$35. Since that time there has been little or no trading in round lots, which are nominally quotable at \$36, but 100-ton lots of Bessemer have been sold at \$36, and Open Hearth at \$37, f.o.b. Chicago.

Merchant Pipe.—There has been considerable activity in the market, both bed manufacturers and merchants having covered to a liberal extent during the past ten days. It is reported that railroads in the district of St. Louis and Kansas City have been protecting old freight rates and hence the demand for quick shipment has been stimulated in that section. The independent mills that have been selling under quotations have advanced prices so that discounts are now on a par with the official prices made by the largest interest in the market. The following are the official prices, Chicago, base, random lengths, for mill shipment, carloads only:

	Steel Pipe.		Guaranteed Wrought Iron.	
	Black.	Galvd.	Black.	Galvd.
	Per cent.	Per cent.	Per cent.	Per cent.
¼ to ¾ inch.....	66½	56½	63½	53½
¾ inch.....	68½	58½	65½	55½
¾ to 6 inches.....	73½	63½	70½	60½
7 to 12 inches.....	71½	61½	68½	58½

Boiler Tubes.—The market has continued steady with a fair volume of business, but without essential change in prices. The following table of discounts is current for mill shipment:

	Steel.	Iron.
1 to 1½ inches.....	43½	38
1½ to 2½ inches.....	56	36
2½ to 5 inches.....	61	46
6 inches and larger.....	56	36

The demand from store has been fair and the market has continued steady. Quotations remain unchanged on the basis of the following schedule of discounts:

	Steel.	Iron.
1 to 1½ inches.....	35	35
1½ to 2½ inches.....	47½	32½
2½ to 5 inches.....	55	42½
6 inches and larger.....	47½	..

Merchant Steel.—A very quiet market has been experienced, without essential change in the prominent features. The movement is quite liberal on old contracts, but new business is light. Tool Steel has been moderately active and steady. For mill shipment prices are as follows: Smooth Finished Machinery Steel, 2.01½c. to 2.11½c.; Smooth Finished Tire, 1.96½c. to 2.11½c.; Open Hearth Spring Steel, 2.66½c. to 2.76½c.; Toe Calk, 2.31½c. to 2.46½c.; Sleigh Shoe, 1.86½c. to 1.96½c.; Cutter Shoe, 2.41½c. to 2.61½c. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 8c. for mill shipments; Specials, 12c. upward.

Rails and Track Supplies.—The feature of the week has been the active demand for Light Rails, sales aggregating upward of 5000 tons for shipment beginning in February. There has continued to be some inquiry for Heavy Sections, but it has not resulted in business of importance. The market continues strong, official prices remaining unchanged at \$28 for Standard and \$27 for second quality, mill shipment. Prices for Light Rails continue firm at \$35 to \$40, according to weight, with liberal premiums obtained for small amounts. Track Supplies have continued in good demand, but with ample supplies this has been readily met at previous quotations, which are as follows: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.25c.; Square Nuts, 2.95c. to 3.10c.

Old Material.—A slightly easier tone has developed for Old Steel Rails, both long and mixed lengths, and for Agricultural Malleable. Other kinds have been without essential change. There is only a moderate outlet to mills, so many being idle for lack of fuel and other causes, but the offerings are not large. Relaying Rails and Old Car Wheels are little better than nominal. There has been scarcely enough trading to establish quotations. The following are the prices per gross ton, Chicago.

Old Iron Rails.....	\$24.00 to \$24.50
Old Steel Rails, mixed lengths.....	18.00 to 18.75
Old Steel Rails, long lengths.....	23.50 to 24.00
Heavy Relaying Rails.....	31.00 to 31.50
Old Car Wheels.....	24.00 to 24.50
Heavy Melting Steel Scrap.....	18.00 to 18.50
Mixed Steel.....	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates.....	\$21.00 to \$22.00
Iron Car Axles.....	24.50 to 25.00
Steel Car Axles.....	23.50 to 24.00
No. 1 Railroad Wrought.....	19.50 to 20.00
No. 2 Railroad Wrought.....	17.50 to 18.00
Shafting.....	20.00 to 21.00
No. 1 Dealers' Forge.....	16.00 to 16.50
No. 1 Bushing and Wrought Pipe.....	14.00 to 14.50
Iron Axle Turnings.....	14.00 to 14.50
Soft Steel Axle Turnings.....	14.50 to 14.75
Machine Shop Turnings.....	13.50 to 14.00
Cast Borings.....	10.00 to 10.50
Mixed Borings, &c.....	10.50 to 11.50
No. 1 Bollers, cut.....	14.50 to 15.00
Heavy Cast Scrap.....	17.25 to 17.75
Stove Plate and Light Cast Scrap.....	13.00 to 13.50
Railroad Malleable.....	16.25 to 16.50
Agricultural Malleable.....	15.00 to 15.25

Metals.—Copper has continued in good demand and further strength has been developed with higher prices asked. Lake is held at 12¼c. in carload lots and 12½c. in a jobbing way. Pig Lead has sold well for Eastern shipments, the demand coming mainly from New York, and the market has continued firm at 4.05c. in 50-ton lots, 4.07½c. in carload lots and 4.10c. in a jobbing way. Spelter has continued to sell well and the market has continued to rule strong with the tendency still upward. Sales of Slabs have been made at 4.75c. in carload lots, f.o.b. Chicago. Sheet Zinc has been firm at 6¼c. in lots of 600 lbs. and over. Old Metals have sympathized with new material, full prices being asked and obtained, with a good demand at the following prices: Heavy Cut Copper, 11c.; Red Brass, 11c.; Copper Bottoms, 10c.; Lead Pipe, 3.90c.; Zinc, 3.80c.

Coke.—Reports from the Connellsville district are to the effect that the congestion is as irritating as ever, miles and miles of track being covered with loaded cars, which is interfering with work at the ovens. Sales in this market have been confined largely to small lots on track for immediate delivery. Virginia Coke is sold at \$9 to \$9.50, and Connellsville Coke at \$10 to \$10.50, on track, Chicago. There seems to be little disposition to make contracts either on the part of the consumers or the ovens, and prices are nominal.

At the Duquesne Club, Pittsburgh, on Saturday evening, the Carnegie Steel Company gave a banquet to the executive officials of the Carnegie Company and allied interests. It was attended by about 70 guests, including a number of prominent officials of the United States Steel Corporation. Ex-Judge James H. Reed, general counsel of the Carnegie Steel Company and a director of the United States Steel Corporation, acted as toastmaster.

Philadelphia.

FORREST BUILDING, January 27, 1903.

It is difficult to find any definite change in the condition or in the outlook in the Iron trade. Abnormal conditions are usually temporary conditions, but as they have continued several months and show no immediate prospect of change there is some danger that they may be accepted as normal. Be that as it may, Coal and Coke cannot continue indefinitely at present prices; neither can Pig Iron, although a change in the price of fuel would be very likely to affect Pig Iron similarly. But there is no very distinct prospect of a change in either of these commodities in the near future, for the following reasons: 1, Because there are no accumulations of Pig Iron; 2, because production, large as it is, is taken as rapidly as it can be shipped, and, 3, the demand during the next two or three months is likely to be large enough to make accumulations out of the question. For these and other reasons which might be given the chances for lower prices during the next three or four months are not very promising, although both makers and consumers realize the fact that they are not on as safe ground as could be desired and would really like to see Iron down to \$20 per ton, if cost could be reduced in proportion. There appears to be no alternative, however, but to wait the natural course of events. With more Coal and more Coke, and with better transportation facilities, things will begin to straighten themselves out. It may require three months or it may require the entire year to accomplish this; all depends on circumstances, the character of which it is impossible to foresee. The margin between daily supplies and daily requirements is so narrow that a little more or a little less either way would be reflected in prices almost immediately, but no one appears to be able to say which will come first, so that for the present operations are mostly for short deliveries. Prices, however, remain just about as they were a week ago and, as we said before, there is nothing in sight to change them except in very small fractions.

Pig Iron.—The market has no distinct character at present, but if the embargo on cars, Coke and Coal continues, as seems not improbable, there will be danger of a repetition of the scarcity which was so severely felt a few months ago. At the moment there is no special scarcity for next month's deliveries, and the hope has been indulged in that toward April something approaching to normal conditions would be established, but recent events are less encouraging in regard to that phase of the situation. The movement of Coal and Coke is extremely disappointing, and unless there is speedy improvement there will be danger of another Pig Iron squeeze. As a matter of fact, if February shows no improvement in the fuel situation March will be pretty sure to show worse conditions in Pig Iron. Which it will be and to what extent it will be is something that cannot be foreseen, depending as it does on a variety of contingencies; even the weather itself may have considerable influence. There is also some uncertainty in regard to the arrivals from abroad; the advance in freights and the heavy shipments of Coal may cause a postponement of Iron shipments, which would be rather a serious matter at this particular time. These are possible contingencies and may not get beyond that, but when there are only three or four days' reserves to fall back upon it is about time to see where we are at. As regards the week's business, it cannot be claimed that there is any change in prices. Small and moderate sized lots for February and March shipments have brought full outside figures, but as the months are extended prices have been shaded off and for six to nine months' shipments quite important concessions have been made in one or two instances. But the tone of the market is not weak, it is sensitive and unsettled, and will doubtless remain so until the fuel situation improves, but prices are not weak. Foreign Iron is getting scarce for prompt deliveries, and asking prices for shipments are higher. Cargo lots of Middlesbrough No. 3, about \$17.50; German (Westphalia), \$20.50 to \$21, and Hematites at \$20.25 to \$20.75 for full cargoes, c.i.f., duty paid, cash against documents. General quotations for deliveries in buyers' yards, usual terms, are as follows:

No. 1 X Foundry.....	\$24.00 to \$25.00
No. 2 X Foundry.....	22.25 to 22.75
No. 2 Plain.....	21.50 to 22.00
Gray Forge.....	20.50 to 21.00
Middlesbrough, No. 3.....	21.00 to 21.50
Scotch.....	22.50 to 23.50

Billets.—The market is difficult to quote, as requirements are mostly for special Steels, for which special prices are paid. Ordinary Steel, however, is quoted at \$31.50 for American, or \$27 to \$28 for foreign, the latter delivered on dock, duty paid. The advance on ocean freights besides a stronger market in Germany makes it difficult to work business through unless at an advance of prices. One sale of 500 tons was reported at about \$29.

Plates.—There is an excellent demand for Plates, and some of the leading mills in the district are unable to accept all the business that is offered to them. Large additions have been made to the order books during the past week, however, and prices are extremely strong, with 2c. at

mill as an inside price for the very best class of business, and a little more than that on the general run of orders.

Structural Material.—There is quite a good demand, but there is not much difficulty in getting deliveries on ordinary specifications. Special sizes are subject to from three to four weeks' delay, but with increasing capacity for output the shortage is not likely to be very severe unless caused by the want of fuel. Prices unchanged, viz.: Beams or Channels, ordinary sizes, 1.73½c. to 1.78¼c., carload lots, as a minimum.

Bars.—The Bar situation is somewhat peculiar and not altogether satisfactory. About half the mills are closed for want of Coal and prospects for getting it are not much improved, but all the same the supply of Bars is equal to the demand. What the condition would be if the mills could all run full is a problem, but it may be that with more Coal more Bars would be wanted, as the shortage affects consumption as well as production. Prices steady and unchanged, viz.: 1.93½c. to 1.98½c. for Refined Iron and 1.73½c. to 1.80c. for Steel, carload lots as a minimum quantity.

Sheets.—The demand is improving and there is also a slight tendency toward better prices. Raw material looks like going higher, in which case finished products must follow. Sheets being more out of proportion than almost any article on the list.

Old Material.—Prices are steady, but with so many local mills shut down for want of fuel the demand for the present is rather light. Quotations are more or less nominal, but bids and offers are about as follows for deliveries in buyers' yards:

Old Steel Rails.....	\$20.75 to \$21.25
Heavy Steel Scrap.....	20.00 to 21.00
Low Phosphorus Scrap.....	26.50 to 27.50
Old Steel Axles.....	25.00 to 26.00
Old Iron Rails.....	23.50 to 24.50
Old Iron Axles.....	29.00 to 30.00
Old Car Wheels.....	20.50 to 21.50
Choice Scrap, R. R. No. 1 Wrought.....	22.50 to 23.50
Country Scrap.....	20.00 to 21.00
Machinery Scrap.....	19.75 to 20.25
No. 2 Light Scrap.....	18.00 to 19.00
No. 2 Light (Ordinary).....	14.50 to 15.00
Wrought Turnings.....	16.00 to 16.50
Wrought Turnings, Choice Heavy.....	17.00 to 17.50
Cast Borings.....	10.00 to 10.50
Stove Plate.....	14.00 to 15.00

William Dette, formerly of the firm of J. K. Dimmick & Co., has established the new firm of William Dette & Co., who will conduct a general commission business in Pig Iron and Coke, with offices in the Pennsylvania Building, Fifteenth and Chestnut streets, Philadelphia.

Cincinnati.

FIFTH AND MAIN STS., January 28, 1903.—(By Telegraph.)

Generally speaking the Pig Iron market is quiet and especially so in the regular Foundry and Mill grades. Some sales of Basic are reported in round lots, but outside of these the trade has been almost entirely confined to small lots. There are a number of rumors regarding the loss of sales by reason of some other seller cutting the price. For instance, No. 2 was offered at \$18.50 to \$19.50, Birmingham basis, a week ago with rumors of some being tendered as low as \$18. Now the range is \$18 to \$19.50, and agents are complaining of the loss of a 200-ton order for prompt shipment at the price of \$21, Cincinnati, or \$17.75, Birmingham basis. While it is generally conceded that Gray Forge and kindred Irons are strong, yet a story comes from St. Louis, said to be entitled to some consideration, that a lot of 1000 tons of this grade was sold a concern there on the basis of \$16.75, Birmingham. Whether these reported sales are true or not the fact remains that agents get restless after two months of dullness and begin to tempt their furnaces with good business on the cut price plan. If the market has not sufficient inherent strength a slide of some dimensions will come and the next two weeks or so will beyond doubt test the situation more than it has been recently. The complaint regarding car service indicates that the situation is still distressing. Freight rates from the Hanging Rock district, \$1.15, and from Birmingham to Ohio River points, \$3.25. We quote, f.o.b. Cincinnati, for delivery throughout the year, as follows:

Southern Coke, No. 1.....	\$21.75 to \$23.00
Southern Coke, No. 2.....	21.25 to 22.50
Southern Coke, No. 3.....	20.75 to 22.00
Southern Coke, No. 4.....	19.75 to 20.75
Southern Coke, No. 1 Soft.....	21.75 to 23.00
Southern Coke, No. 2 Soft.....	21.25 to 22.50
Southern Coke, Gray Forge.....	19.75 to 20.75
Southern Coke, Mottled.....	19.75 to 20.75
Ohio Silvery, No. 1.....	31.15 to 32.15
Lake Superior Coke, No. 1.....	25.15 to 25.65
Lake Superior Coke, No. 2.....	24.15 to 24.65
Lake Superior Coke, No. 3.....	23.15 to 23.65

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$27.75 to \$28.75
Lake Superior Car Wheel and Malleable.....	27.50 to 28.50

Plates and Bars.—The general market is quiet. We quote, f.o.b., as follows: Iron Bars in carload lots, 1.92c.,

with half extras; same, small lots, 2.20c., full extras: Steel Bars, carload lots, 1.72c., with half extras; same, small lots, 2.20c., full extras. Plates are quoted nominally, ¼-inch, in carloads, 1.70c.; same, 3-16, 1.80c. As a matter of fact, however, mills having Plates to ship are getting 2.15c. without trouble. I-Beams and Channels, 1.70c., base. All prices f.o.b. Cincinnati.

Old Material.—We quote dealers' buying prices, f.o.b. Cincinnati, No. 1 Wrought Railroad Scrap, \$19.50 per net ton; Cast Scrap, \$16 to \$16.50 net ton; Iron Rails, \$24 to \$25, gross; Steel Rails, long lengths, \$23.50, gross; Iron Axles, \$27, net ton; Car Wheels, \$21.50, gross.

Birmingham.

BIRMINGHAM, ALA., January 26, 1903.

There are three elements in the Iron market, each one of them having an influence and each working without reference to the others. There is the element well sold ahead and which is independent enough to book sales only when prices are inducing. It takes top prices to get their make. Then there is the advocate of steady values who believes in moderate prices and profits, and is disposed to fight extreme prices, and who is equally opposed to concessions to effect sales. The third element has no entangling alliances in the way of sales for forward deliveries, and to that the desire to browse in new pastures is a temptation to take off some of the price when necessary to effect sale. The price the buyer pays depends upon which one of these elements he strikes. The various interests are not a unit in their report of market conditions. Some say that there is a very good demand, while others report only a moderate business. We know the business cannot be heavy, for we have not the material necessary for a heavy business. But it is enough to certify the statement that the offerings are all cleaned up. The prices obtained still show the irregularity that has prevailed for some time past. There was a sale of No. 2 Foundry at \$18; and this was rock bottom price for that grade. It took indisputable evidence to convince doubting Thomases that such value was accepted. The sale was for nearby delivery. All the conditions and facts connected with the sale are withheld. Every single interest in the Birmingham district denies making the sale. But the district will get the credit of it. It has had no effect on values. That one lot was all that was to be had at that price. Why this lot was let go at \$18, when others obtained \$20, can be answered by "the fortune of war." Whatever was the object in naming such a price, it has had no influence on values here. There were sales of this grade at \$20 for cash and nearby delivery, and there were sales in limited quantity at as high as \$20.50. And there were sales also at \$19.50 for the same delivery. But none of these nearby sales are of magnitude. For the second quarter the quotations are \$20 for No. 2 Foundry. It is very probable that a concession would be granted if the case demanded it. Some get it and some fail to get it. The inference is that one must have a good case to obtain it. For the second quarter some sold at \$20. For the last half of the year the quotation is \$19, with a few sales at that and some at \$18.50. For the last half of the year there was a sale of 500 tons each No. 1 Soft and No. 1 Foundry at \$20, and there was a sale of No. 1 Soft at \$20.50 for delivery the first half of the year. There was a sale of No. 2 Soft, involving 3000 tons, for delivery the last half of the year at \$19. Your correspondent saw telegrams from Eastern points offering \$19 for No. 2 Foundry, delivery from March to July, which were declined simply because the seller was loaded with all he could deliver. The quotation for last half of the year is \$19, with \$18.50 as a minimum. No. 3 Foundry, while quoted at \$19 to \$19.50, scored sales at \$20, the same price obtained for No. 2 Foundry. Your correspondent saw sales registered at \$19 for No. 4 Foundry, while it is quoted at \$18 to \$18.50. There has been no change in the situation as to Gray Forge. It is still quoted at \$17.50, with some sales registered at \$18. There is a good deal of nibbling going on about this grade, but no big fish have yet been landed. But frequent inquiry would indicate some anxiety concerning this grade. There was a small transaction in No. 1 Silver Gray at \$22.50, the buyer first bidding \$19 and finally accepting seller's price. This is a pretty fair illustration of the trading going on.

Shipments have materially increased of late, but the greater part of them are for account of old business. There is rather an optimistic feeling prevailing, and it is anticipated that a very satisfactory business will be developed this year. We will have some additions to our furnace capacity, and the probability is that about as many will blow out, for various reasons, as blow in. The furnace at Rising Fawn is now reported as ready or nearly so, and the one at Gadsden, erected by the Alabama Consolidated Company, will soon be ready to go in commission. The one at Tuscaloosa has also been mentioned. The Lookout Mountain Iron Company have erected over 200 houses on the site of their plant, and will put up 300 more. They are putting forth every effort to quickly complete their Coke battery. To mention Coke is but to repeat what has been said about it

for the past few weeks. The conditions have not changed a particle, and your correspondent is informed that there is no trouble to sell it at \$6.50, at the ovens. Coal is still in fine demand, and there is much belated business to provide for. More mines are being opened, and there is constant activity in the trade.

John M. Dwyer, so long connected with the Birmingham Rolling Mills as the superintendent, and lately in the same capacity with the Anniston Mill, has accepted a position with a Louisville firm, and has entered upon his duties there. The management of furnace interests in this district does not sleep on beds of roses. The assembling of material in quantity sufficient to keep the furnaces well fed and avoid a shut down is a problem that commands constant study and application. So far there have been no insurmountable obstacles, but there has been a considerable hanging on to the ragged edge of almost futile effort, and bare escapes from a shut down have been not infrequent. Unless labor is obtained in better supply we will be fortunate if we hold output at its present volume. There are some negotiations going on concerning both mineral and Coal lands. Eastern capital is ready to absorb any good thing that offers. But a proposition must be mighty close to the gilt edge series to win the favor it seeks.

The Hardware firm of Moore & Handley will, with the advent of spring, commence the erection of their burned out stores. They will be colossal for a place of the size of Birmingham, and will be equipped with all the appliances demanded for the prompt and successful handling of a great and growing business.

Cleveland.

CLEVELAND, OHIO, January 27, 1903.

Iron Ore.—The placing of embargoes on the shipment of general merchandise through this territory, for the purpose of cleaning up the congestion that exists on the railroads, has seriously affected the shipment of Ore. Most of the railroads have demanded that gondola cars be used only in the shipment of Coal or Coke, and this, of course, has prevented the movement of Ore away from the Lake Erie docks. Fortunately, the furnaces are in such condition that they can stand the lessening of shipment without running short of material. So far nothing has been done looking toward the establishment of prices for the coming season, nor has there been a discussion of rates in any tangible form.

Pig Iron.—The demand has been fair for Foundry Iron, and yet there is not that forward buying nor the interest in the distant future which the present state of the market might indicate. There is also a good demand at present for Bessemer and Basic, and yet the buying for the future is not mentioned with any degree of concern. In the Foundry grades the buying for spot delivery has been brisk at the prices which were established a week ago. The smaller furnaces which have material for the open market at this time have little or no difficulty in covering their output at \$24.50 to \$25, and the consumers seem more than anxious to get that supply. It is evident also that the immediate supply is certainly limited, and with some furnaces has been exhausted wholly. Buying for the third quarter has been more brisk this week. The fact that liberal buying for the second quarter has not exhausted the supply, despite the orders carried forward from the last quarter of last year to the first quarter of this and which will be carried forward into the second quarter of this year from the first quarter, is suggestive at least. It seems to indicate that the sale of Pig Iron has not been as heavy as has been predicted and as has seemed, with some consideration being given to the possible influx of new capacity before this quarter is out. Forward prices are as they have been previously quoted: \$23 for No. 2, Valley furnace, for first half delivery and \$21 for No. 2, second half delivery, at the furnace. The Steel Corporation have not started to buy yet for second half delivery, and there is still a good deal of speculation as to the reason for this. While a good deal of Bessemer is now being delivered which was ordered for 1902 delivery, consumers do not seem to be covering the needs which were not supplied in time with material from other districts. Some have said that the mills are curtailing production, and are not using as much Pig Iron as formerly. This is true in some instances where the Coal shortage has been the most severe. Bessemer prices have continued at \$22 for first half and \$21 for second half, Valley furnace. The Basic producers here are catching up on their orders which were received previously, and it is beginning to look as if the stacks would have some material for sale for delivery after May 1. The improved situation is a direct result of a better Coke supply, which has been brought about by the embargoes on the railroads, which have permitted the free movement of Coal and Coke instead of the other articles of general commerce.

Finished Iron and Steel.—The growth of interest in the Bar Iron situation has again been one of the leading features of the market, if not the most interesting one. The general tone of the whole market has been stronger than during the preceding weeks of this year, but the Bar Iron

situation has gained exceptional strength. The buying has been rather heavy and there has been enough interest to stiffen the prices greatly. A week ago the market was steady among the larger mills at 1.70c., Pittsburgh, but the smaller mills were cutting that price on good orders. Now it is said that the minimum quotation is 1.75c., Pittsburgh. The whole effort of the big Steel companies is to increase the value of Bars and to place them instead of Billets. In this they have been partially successful, for the sales of both Bar Iron and Bar Steel have been very large and most encouraging during the past few days. Steel Bar prices are as strong as ever, with Bessemer bringing 1.60c. and Open Hearth 1.70c., Pittsburgh. The Billet situation seems to fit into the Bar situation well. The demand for Bessemer has been brisk of late. In a good many instances square Bessemer Bars are being substituted for Billets. The Southern mills have been selling a good deal of material here of late in this territory, but have not met the demand by any means. The Plate situation does not change. While there is still some capacity uncovered, the amount of it is not large. Specifications on old orders are very heavy, being at times even in excess of the first stipulations of the contracts, which seems immediately to dispel any fear that the market is easing. In addition the smaller mills are constantly getting a better run of orders. The agents of these small concerns have reported in the past few days that the sales of Plates for quick shipment have been much heavier than at any previous time this year. The smaller mills are having no difficulty in getting 2c. at the mill for their Plates, with freight rate added to the extent of \$4 a ton to get the material to Cleveland. This premium does not deter the buyers, to whom prompt deliveries now are very valuable. The demand for Structural Steel seems to be improving steadily. The smaller producers are very well filled up with orders for prompt shipment, upon which they are still getting premiums, and are also finding a good run of orders. It is quite evident that the smaller mills are having difficulty in approaching the prices which were paid the latter part of last year, and it hardly seems possible now that the first half of this year will produce any such extravagant prices. It is realized, however, that the big bulk of the spring business has not been done as yet. At present the smaller mills are getting 1.75c. to 1.85c. at the mills, with the larger mills getting 1.60c., Pittsburgh, on what they have for sale throughout the year. The Sheet trade has not changed. The market is still weak, with many of the smaller mills trying to get business by cutting prices and with the larger mills constantly looking for orders and realizing that the output is greater than the need. The situation is not encouraging, although it is realized that there is a good business ahead. Prices hold nominally at the following: No. 27, out of stock, 3.10c. to 3.25c., and the same at the smaller mills 1.85c. to 1.95c. Galvanized Sheets are bringing 3.70c. for No. 27.

Old Material.—The Scrap market has been much easier all of this week. The middlemen are making sales with the greatest difficulty and the mills are holding off for reduced prices, but quotations are unchanged, as follows: No. 1 Wrought, \$19, net; Iron Rails, \$25.50, gross; Iron Axles, \$28, net; Cast Borings, \$12, gross; Car Wheels, \$22.50, gross; Heavy Melting Steel, \$19, gross; Old Steel Rails, \$20, gross.

St. Louis.

CHEMICAL BUILDING, January 28, 1903.—(By Telegraph.)

Pig Iron.—In so far as actual sales are concerned since our last report there has been no increase in volume. While there is some little new inquiry, it is not heavy and a waiting mood seems to be the general disposition of the buyers. The Coke conditions do not improve and there seems to be considerable more complaint on the part of Pig Iron users on account of recent delays in delivery. Prices are holding very firm. We quote, f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry.....	\$23.75 to \$24.75
Southern, No. 2 Foundry.....	22.75 to 23.75
Southern, No. 3 Foundry.....	22.25 to 23.25
Southern, No. 4 Foundry.....	23.75 to 24.75
No. 1 Soft.....	23.75 to 24.75
No. 2 Soft.....	22.75 to 23.75
Gray Forge.....	21.75 to 22.75
Southern Car Wheel.....	29.00 to 30.00
Malleable Bessemer.....	25.75 to 26.25
Ohio Silvery, 8 per cent. Silicon.....	31.00 to 32.00
Ohio Strong Softeners, No. 1.....	to
Ohio Strong Softeners, No. 2.....	to

Bars.—Jobbers report a better volume of orders at this time, and the way trade has opened up the past week looks like an early and substantial beginning for spring business. We quote from the mills Iron Bars at 1.80c. to 1.90c. and Steel Bars at 1.80c. to 1.85c. Jobbers quote Iron Bars at 2.25c. and Steel Bars at 2.25c. in small lots from store, with 2.15c. in large quantities.

Rails and Track Supplies.—Report from this department of the market is merely a repetition of the conditions which have been ruling for some time past. The demands for new projects in the railway line continue numerous and

keep trade in this department active. We quote as follows: Splice Bars at 2.05c.; Bolts, with Hexagon Nuts, 3.15c. to 3.35c.; with Square Nuts, 3c. to 3.10c.; Spikes, 2.25c. to 2.50c.

Angles and Channels.—Jobbers report a much improved demand for small Angles and Channels, with prices ruling on the old basis. For material of this class 2.50c., base, is asked.

Pig Lead.—Very firm price conditions, with a moderate volume of demand, is the report from this department. We quote Chemical at 3.97½c. and Desilverized at 3.97½c. to 4c.

Spelter.—The demand for Spelter is of a more brisk order and prices are very firm. We quote 4.80c. to 4.85c.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, January 28, 1903.

Pig Iron.—While sales of Pig Iron are limited the market is very strong, and unless the Coke situation soon improves, which is not very likely, prices for prompt Iron may be higher, as it is very scarce. Bessemer Iron for February and March shipments brings \$22 to \$22.50 at Valley furnace and we note a sale of 1000 tons at \$22. For shipment up to July Bessemer Iron could be bought at \$21 at furnace. The large consumers are well covered, but are not getting prompt deliveries on their contracts. It is said that nearly all of the Iron that should have been shipped to the United States Steel Corporation interests in the last quarter of last year is still undelivered. For this reason it is hardly likely that the Steel Corporation will buy any more Iron for some time at least. The Bessemer Furnace Association has been renewed for another year, with J. G. Butler, Jr., of Youngstown as chairman. A few small sales of Gray Forge Iron are being made at about \$20.50, Pittsburgh. There is a good deal of inquiry for Foundry Iron and Northern brands of No. 2 for early delivery bring \$23 to \$23.50, Pittsburgh. Southern No. 2 Foundry is being freely offered at \$23.15, Pittsburgh. A good deal of Middlesbrough Iron is coming into the Pittsburgh district at prices ranging from \$21.50 to \$22, delivered.

Steel.—While not much Steel is changing hands the market is very firm, and Bessemer Billets are about \$30, Pittsburgh, with some sellers quoting higher figures. The scarcity of Coal prevents the Steel mills from getting out their normal production of Steel, and it is scarce. Some high Carbon Billets have been recently sold in this market at prices ranging from \$35.50 for Carbons 0.50 to 0.65 and \$37 for Carbons running from 0.65 to 0.85. These prices are f.o.b. Pittsburgh. The greater part of the Steel that is being shipped to large consumers is on sliding scale, contracts based on the price of Bessemer Iron, f.o.b. Pittsburgh. Several such contracts for both Bessemer and Open Hearth Billets have recently been made with large consumers of Steel in the Pittsburgh district. For the above reasons the amount of Steel that is being sold in the open market is comparatively small.

(By Mail.)

The embargoes placed by the railroads on all kinds of freight, except Coal, live stock and perishable goods, have created a condition among the Iron and Steel mills in the Pittsburgh district that is without precedent. Plants are unable to make or receive shipments and a number of leading works have closed down in all departments until the embargo has been lifted. Others who are able to get part of their requirements of Coal are running about half time and the result is that output of Iron and Steel of various kinds has been cut down very materially. This is causing a decided scarcity on some lines of Iron and Steel, and higher prices are certain if present conditions continue for any length of time. The Erie, Baltimore & Ohio, Pennsylvania and other leading lines are declining to receive freight except as noted above, and the situation could hardly be worse. The railroads do not make any definite promises for relief, but claim that they are doing all in their power to get the freight moved. The situation in Coke is probably worse than at any time for months and on one day last week 15 or more furnaces in the Pittsburgh and Valley districts were down for want of Coke. At Youngstown three stacks of the National Steel Company are off, also the Thomas stack at Niles, and a number of other furnaces in the Mahoning and Shenango Valleys are banked. A very heavy snow a few days ago made the situation worse and it does not seem that permanent belief can be had for some time. The independent Sheet and Tin Plate mills have various projects under way looking to the securing of a regular supply of Sheet and Tin Bars. Negotiations have been opened with the Clairton Steel Company and as a result of these this company will probably install Sheet Bar mills and erect a Bessemer Steel works at Clairton. It is also possible that the Youngstown Iron Sheet & Tube Company, at Youngstown, may build a Bessemer works. This company have an Open Hearth plant under way, but may decide to add a plant to make Bessemer Steel for their own use and to sell it in the open market. It is also re-

ported that a number of leading Sheet mills may consolidate into one company, and it is said that the matter has gone so far that options have been asked on a number of works. The minimum price of Sheet Bars at the present time is \$30, while some Sheet mills are still taking in Bars at higher prices. It is claimed that present prices of Sheets do not allow a profit with Bars at \$30 or higher.

Nothing of special interest other than noted above has developed in the Iron trade since our last report. The shortage in fuel and also in motive power and cars is causing extraordinary expense to manufacturing concerns that have either shut down entirely or else are running very short handed. Thousands of loaded cars are standing on the various railroads of the Pittsburgh district and it is claimed that cars loaded early in January have not been moved. The railroads are doing their utmost to relieve the situation and the recent action of the Pennsylvania Railroad in negotiating a loan of \$35,000,000 for improvements is proof of this. It is hardly likely that the situation can continue for any length of time as bad as it is now, but it will likely be three or four months before railroads are in normal condition.

Muck Bar.—The market on Muck Bar is firmer, due to the fact that many of the mills are running only partially, due to the shortage in Coal. Prices of domestic Muck Bar are firm at \$33 to \$33.50, Pittsburgh.

Plates.—A heavy tonnage continues to be placed in Plates, but the market is without special change. A few mills that are able to ship out promptly are getting from 1.75c. up to 2c. for small orders of Plates. However, most of the tonnage is being placed at official prices, which are as follows: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plates more than 100 inches wide, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Bars.—A very much better demand for Iron Bars is reported, and prices are much firmer than for some time. Several of the leading mills are now holding firmly at 1.80c., Pittsburgh, and are declining to shade that price. One large maker of Iron Bars says that their tonnage this month has been larger than in November and December combined. A good deal of tonnage is being placed in Steel Bars, and prices are firm, there being an intimation that a slight advance may be made before long. We quote Iron Bars at 1.80c. in carloads and 1.85c. in small lots, half extras, as per National card. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10 per lb. extra. Quantities less than 1000 lbs., 0.30 per lb. extra, the total weight of a size to determine the extra regardless of length.

Structural Material.—The leading interest, the American Bridge Company, have recently booked some heavy contracts aggregating 25,000 to 30,000 tons. A large amount of bridge and building work is under way, and it is certain that a large part of this will be placed. A great many small orders are being received by the mills right along, and tonnage this year promises to be as large or exceed last year. Prices are as follows: Beams and Channels up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Tees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

Steel Rails.—Two contracts for 10,000 tons each have recently been placed, and in addition some small orders. Output on Rails this year will likely be larger than last year, as tonnage already booked is heavier, and the Buffalo mill of the Lackawanna Steel Company will be making Rails in August or September. We quote at \$28, at mill.

Spelter.—Prices on prime Western Spelter continue to advance, and best grades are now quoted at about 4.90c., Pittsburgh.

Rods.—The market on Rods is firmer, and mills are now quoting \$35.50 to \$36 on Bessemer. The higher prices on Rods are due to the fact that Steel mills are short of fuel and are not getting out their usual tonnage. In addition, the improved demand for Wire products is causing a much larger consumption of Rods. Open Hearth Rods are held at about \$37, maker's mill.

Merchant Steel.—There is nothing of special interest to note. Only a fair amount of new tonnage is being placed, but the mills are working steadily on old contracts. For mill shipment we quote as follows: Tire, 1.90c. to 2c.; Spring, 2.10c. to 2.15c.; Toe Calk, 2.10c. to 2.15c., base; Sleigh Shoe, 1.90c. to 2c. Differentials are as follows: Less than 2000 lbs. of a size and not less than 1000 lbs., 10c. advance; less than 1000 lbs. of a size, 30c. advance; Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. in less than carloads, delivered in territory east of the Mississippi and north of the Ohio rivers. Tool Steel is

6½c. to 10c. for ordinary grades and 12c. and upward for special grades.

Hoops and Bands.—Shortage of fuel is interfering very seriously with output, several of the leading Hoop mills running half time or less. Prices are firm and we continue to quote Cotton Ties at 95c. a bundle at mill. Steel Hoops from Bessemer stock are 1.90c. in 250-ton lots and over, and 2c. in carloads, at mill. Bands are quoted at 1.60c. up to No. 12 gauge, with extras as per Steel Bar Card. For Open Hearth stock \$2 a ton advance is charged.

Sheets.—The various plans being tried by the independent Sheet mills to secure a regular supply of Sheet Bars are fully set forth in another part of this report. It is stated that even with Sheet Bars at \$30 a ton at mill, which can be considered the minimum of the market, and some mills have contracts at higher prices, there is no profit in making Sheets at present prices. There is no improvement to note either in demand, which is very light, or in prices, which continue to be shaded more or less, but mostly for Galvanized. Prices of Black Sheets are fairly strong, but there is very little doing in these. We quote Nos. 22 and 24 Black Sheets, box annealed, one pass through cold rolls, at 2.45c.; No. 26, 2.55c.; No. 27, 2.65c., and No. 28, 2.75c. These prices are for carloads and larger lots, buyers charging the usual advances on small lots from store. On Galvanized Sheets we quote Nos. 26, 27 and 28 at 75, 10 and 2½ to 75, 10 and 5 per cent. off for carloads and larger lots. In net prices these are equal to about 3.25c. for No. 26, 3.42c. for No. 27 and 3.70c. for No. 28. These prices apply only on carloads and larger lots and are f.o.b. mill. On less than carloads jobbers charge the usual advances.

Merchant Pipe.—A meeting of the leading independent Pipe mills was held in this city on Wednesday, January 21. Half a dozen or more concerns were represented and the present condition of the Pipe market was carefully considered. It was the opinion of those present that prices now ruling on Pipe are too low and it is probable that as a result of the meeting some method may be tried for getting higher figures. It was pointed out that owing to shortage of fuel Steel was scarce, and that to mills who have to buy Skelp in the outside market present prices of Pipe do not allow a satisfactory profit. We note a heavy demand for Merchant Pipe and the leading mills are filled up for six weeks to two months or longer. Prices are firm, being shaded only in exceptional cases and on very desirable contracts. Pittsburgh basing discounts, which are being very generally observed, are as follows:

	Merchant Pipe		Full weight	
	Pipe, Steel or Iron.	Wrought Iron.	Steel Pipe.	Wrought Iron.
	Blk. Galv.	Blk. Galv.	Blk. Galv.	Blk. Galv.
¾, ¾ and ¾.....	68	58	67	57
1 to 2.....	70	60	67	57
2 to 6.....	75	65	72	62
7 to 12.....	73	63	70	60

NOTE.—Orders for less than carloads will be charged at 12½ per cent. advance. Extra and Double Extra Strong cut lengths, lower random discounts by 10 per cent. net for 6 feet and longer, and 15 per cent. net for 3 to 6 feet.

Skelp.—While the market is quiet, prices on Skelp are firmer than for some time, due no doubt to the fact that the mills are having difficulty in getting fuel and making shipments. In fact, several of the leading Skelp mills have shut down entirely until the congested condition of the railroads has been removed. We quote Grooved Iron Skelp, ordinary sizes, at 1.90c.; Sheared, 1.95c. to 2c.; Grooved Steel Skelp, 1.95c. to 2c., Pittsburgh, or 2 per cent. off for cash in 30 days.

Boiler Tubes.—It is possible an advance in prices of Boiler Tubes may come before long as a result of the meeting of a number of mills in this city last week. Demand is good and a large tonnage is on the books of the mills for future delivery. Discounts are as follows:

BOILER TUBES.		
Steel.		Per cent.
1 to 1½ inches.....		45
2¾ to 5 inches.....		62½
1¾ to 2¼ and 6 to 13 inches.....		52½
Iron.		
1 to 1½ inches.....		36½
2¾ to 5 inches.....		45½
1¾ to 2¼ and 6 to 13 inches.....		35½
CASING.		S. and S.
		Per cent.
2 to 3 inches.....		58
3¾ to 4 inches.....		60
4¾ to 12½ inches.....		63

Coke.—The Coke trade at the present time is in a most unsatisfactory condition. The operators cannot get cars or motive power to move their Coke promptly, and as a result hundreds of thousands of tons are piled up in the Connellsville region awaiting shipment. Furnaces and foundries are unable to get Coke fast as needed and are offering high prices where the seller will guarantee shipment. From \$5 to \$6 a ton is being paid for prompt Furnace Coke and from \$6 to \$7.50 for Foundry. Contracts placed some time since were at lower figures. Output on Coke continues large, and last week the Upper and Lower Connells-

ville regions turned out nearly 290,000 tons. Shipments, however, show a large falling off, due to the shortage in cars and motive power.

Iron and Steel Scrap.—The Scrap market continues somewhat quiet, due to the fact as pointed out in this report last week, that large consumers who bought heavily some time since are out of the market. We continue to quote Heavy Melting Stock at \$21 to \$21.50; Short Steel Rails, \$21.50 in gross tons; Steel Rails for rerolling, \$23 to \$23.25; Cast Iron Borings, \$11.75 to \$12; No. 1 Heavy Busheling Scrap, \$18 to \$18.25, net tons; No. 1 Railroad Wrought Scrap, \$21, net tons; Car Wheels, \$24 to \$24.25, gross tons; Old Iron Rails, \$25 to \$25.50, gross tons. We note a sale of 500 tons of Old Iron Rails at a price equivalent to about \$25.25, Pittsburgh. Also 250 tons No. 1 Wrought Scrap at \$21, Pittsburgh.

McKenna Brothers Brass Company, First avenue and Ross street, Pittsburgh, Pa., have been appointed sales agents for Western Pennsylvania and West Virginia for Tool Steels made by the Firth-Sterling Steel Company of Pittsburgh. A specialty of this concern is Blue Chip Tool Steel, which is said to be especially adapted for high speed and heavy cutting.

The French Iron Market

PARIS, January 1, 1903.

The total of transactions during December has not reached one-half of the aggregate of December, 1901, and even at that time business was not particularly active. Now money is locked up by bankers and capitalists, who are uneasy as to the future. Every proposition relating to enterprises or new works is turned down, and naturally the result is there is absolutely no important business going. The only consolation is that some work is originating in our colonies. For some time past fairly important amounts of Rails and rolling stock have been delivered to them. The Governor-General of West Africa has asked for loan of 50,000,000 francs and which is to be distributed for public undertakings in our African colonies. Sanitation works in the Senegal will absorb 45,000,000 francs, the works for the Port of Dakar are estimated at 10,000,000 francs, the improvement of river navigation 5,500,000 francs, and there is to be extended by 200 km. the line from Konakry to Fout-Djallon. This will call for 17,000,000 francs. Finally a credit of 10,000,000 francs is asked for for a railroad and a port on the Ivory Coast. Evidently all these works will call for considerable tonnage from our Steel plants. But until these credits are effected, which is still doubtful, our Steel works are considering exports pure and simple, although the outlook for profits in that direction is very slight. As a matter of fact, in order to export Rails it is necessary to come down to 100 francs per ton, if not below that figure. There are very few rolling mills which can produce to advantage at such a price.

Generally speaking, therefore, the uncertainty continues to dominate our markets. Buyers are forcing down values. Besides there is a great disproportion between the prices of raw materials and those of finished products, with little hope of an improvement in the situation. Present quotations on Bars should correspond to Coal at 9 to 10 francs, Forge Pig at 55 francs and Blooms at 80 francs. Now, as a matter of fact, Coal is 14 to 15 francs, Pig Iron 61 francs and Blooms close to 90 francs. The Longwy Syndicate is offering Pig Iron for one quarter of the year only at a slight increase in prices over 1902, this increase being justified by higher prices for Coke. When it is considered besides that labor is dear, it will be observed that the situation is really discouraging, particularly for the rolling mills pure and simple, which do not possess blast furnaces, Steel works, &c. The exchanges of opinion between rolling mill men which took place during the meetings of the syndicates in December confirm these views of the situation. It has been the unanimous opinion that a rise in selling prices must be brought about. However, nothing has been decided, which, after all, is better than if a decision had been reached which the members would not have lived up to. The Plate Syndicate has been extended for a further period of three years and has gathered in additional mills. The question has been discussed of forming a fine Sheet syndicate, but such an organization was not regarded as possible owing to the high costs of administration, which would weigh heavily upon the small numbers of producers in this branch. Another serious obstacle was that the special finishing of each mill determines the range of consumers and leads to a wide range in prices. The Beam Syndicate desire to secure the price of 17 francs, f.o.b. station, without any discounts, with the exception of a reduction of 15 centimes per ton for heavy tonnage; but buyers protest and insist that these prices would be extortionate in view of the fact that Beams are being sold by the syndicate for export at 13 francs f.o.b. Antwerp. They claim that the disproportion is too great and will not negotiate.

In the Northern Department Bar Iron is being sold at 15 to 15.25 francs, and sometimes goes below that in cases of necessity. In the Ardennes district Bars are 15.75 for

No. 2, with 50 centimes spread per class. In the Haute Marne district Bars are selling at 16.50 to 16.75 francs. The mills of the Loire and Centre districts generally ask 18 to 18.50 francs.

There is to be built at Longwy a Talbot open hearth plant.

Finally I may note that some of our companies are now building 50-ton pressed Steel cars, similar to those which are in use in the United States. Their advantages are being thoroughly appreciated.

Cincinnati Machinery Market.

CINCINNATI, OHIO, January 26, 1903.

The Lodge & Shipley Machine Tool Company report trade in excellent condition. January has opened up in a very pleasant and satisfactory manner. Orders and inquiries are coming in from all parts of the country, but the matter of immediate delivery of their goods is oftentimes a perplexing question. There seems to be no disposition on the part of the buyer to purchase his goods at a less figure, and none on the part of the manufacturer for disposing of his wares at a cut rate. The company report having had some difficulty in securing steel castings and, in some instances, bar steel, but for the most part they are in good shape. Looking forward to the year before them they are very optimistic, and anticipate it will be the largest and best in the volume of business ever known in the machinery world. During the past year they have added to buildings and equipment about \$50,000, increasing their output very materially and putting them in splendid shape to take care of the increased volume of business offering this year.

The R. K. LeBlond Machine Tool Company are well satisfied with the past year's business, and look for the coming year to be one that will tax their energies to the utmost. Last year they were able to increase the output of their plant about 60 per cent. over any previous year in their history, and they feel confident that with the increased facilities at their command they may even exceed this in 1903. The demand for their products coming from all parts of the country indicates a substantial growth and healthy condition of affairs generally.

The John Steptoe Shaper Company, formerly known as John Steptoe & Co., now having a capital stock of \$125,000, and of which D. Geo. Otting is president and Adam Lauther secretary and treasurer, report business in fine shape and prospects good for its continuance. While it is true that the bulk of their business is domestic, they find some general improvement in export business. They expect soon to increase their output by the addition of a building, 60 x 175 feet, fronting on Jessamine street. This they will equip with all the latest and best machinery, thereby being able to increase their volume of trade fully 20 per cent.

Smith & Mills are builders of shapers exclusively, their specialty being the smaller sizes. They report business very good, with the demand for their output increasing and prospects bright for the future. The year just closed was the largest in their history, and the indications are that 1903 will eclipse all former records.

Belmer Machine Tool Company, located in North Fairmount, this city, have no fault to find with trade conditions. They are adding to their equipment in order to meet the demands that are being made upon them. They have lately installed a large planer, 72 inches by 33 feet, their own make, and several smaller ones; also a new Cincinnati No. 4 miller and a 36-inch Cincinnati Machine Tool Company drill tapping attachment. They report a large number of orders as being received since January 1, and everything seems to point to a prosperous year.

The Bradford Machine Tool Company dispose of almost their entire output of high class lathes to agents placed at advantageous points throughout the world, and they report the year just closing as one of widespread and general demand. The lathes of their make run from 14 to 42 inches, and while formerly their specialty was engine lathes they are now putting on the market all kinds of lathes. They have in the last few months put their special 32-inch lathes on the market, which are meeting with flattering success. They will, in about a month, have their triple geared 36-inch lathes completed. They expect in the near future to add materially to their equipment, thereby increasing their output. They report 1902 as one of the best in their history, and expect 1903, from present indications, to equal or surpass it.

Fosdick Machine Tool Company, situated at Blue Rock and Apple streets, makers of radial drills, report trade all that could be desired, with orders ahead and inquiries coming in at a satisfactory rate. The past year, while possibly not the largest in the history of this firm, was one so healthful and the volume of their output was such that they have no complaint to make. They are running full force full time and are adding to their equipment new tools as rapidly as needed. They report foreign trade looking up somewhat

and scattering orders being received. They have found it necessary to expand by adding to their buildings one 25 x 100 feet, in which to store castings.

The Cincinnati Milling Machine Company say that the year just closed was the largest in volume that they ever had. During the year they completed the redesigning of their entire line of milling machines, being the first to introduce the positive geared feed mechanism to this type of machine tool. The company report a steady increase in the foreign demand, and see nothing ahead to stop the present prosperous conditions in the country. Their present shop equipment has been considerably improved during the year, and they are fully prepared to manufacture a larger output than ever before in the history of their establishment.

The I. & E. Greenwald Company, builders of engines and large manufacturers of gears, report the year just closed as exceptionally fine, much more so than any year for some time past. They are now completing an addition to their already large building, 75 x 100 feet, in which to place new tools in order to handle the immense volume of business that confronts them. About the only thing they have had to complain of during the past year has been the scarcity of coke and pig iron, although at present both of these commodities seem easier. Orders for engines are exceedingly well distributed over the territory in which they seek trade and they are now estimating on several large orders for as heavy engines as they have ever turned out. The trade in coal-washing machinery and gears has also been all that could be desired, and from the number of inquiries now coming in would indicate an increased volume of business for the future.

The American Tool Works Company report the year just closed as the best and most satisfactory one for five years past. During this time they have further improved their line of machines and brought out quite a number of new ones, consisting of lathes, planers and shapers. They are now at work building a number of new tools for their own use, made necessary by the increased demand for their product. They also expect in the near future to expand in the way of additional shop room, but to what extent has not been as yet fully determined. They find a ready market for their output in almost every quarter of the globe and the indications are from all reports that foreign business is looking up somewhat. They are looking forward to the future and expect a greater volume of business than at any time in the past.

Greaves & Klusman are builders of lathes up to 22 inch, which size is a comparatively recent product of their shops. They are well satisfied with the outlook for the coming year, and feel confident that trade will continue to be as favorable as in the year past. They have recently added to their equipment several large machines, and have made arrangements for several more to be delivered in the near future. They report foreign business on the increase, and hope with the close of the present year to see a marked increase in this class of business. They have recently shipped six of their large machines to New Zealand and have inquiries for several others. They have an order from Northern Ohio for one of their large lathes to be shipped by February 1.

Schumacher & Boye are makers of engine lathes exclusively. They produce what is known as the cabinet pattern, and during the year have brought out new 20, 36 and 42 inch tools. They report trade all that they could desire it and if export trade was to return in former proportions they would find difficulty in handling their business. While foreign business is not large, still they see some improvement, and feel confident that within a short time there will be material enlargement. They are now taking bids on a new steel and brick building, which will be 100 x 200 feet, made necessary by their increased volume of business, and will begin its construction as early as the weather will permit. They have recently added to their equipment a new Cincinnati planer, 60 x 60 x 24, and have now under consideration several more extensive additions to their already very large and well equipped plant.

The Dreses Machine Tool Company report trade even better than the beginning of last year, and while orders are mostly from a domestic source, still there are some calls from foreign sources that betoken an awakening. Especially is this true of Scandinavia, England, Holland and Italy. They have ready for shipment six of their large radial presses, which will go forward to England the first of next week. They have just completed a new line of radial drills which have met with remarkable success. As soon as the weather permits they will add a building 80 feet square, in order to meet the demands of what they think will be one of the best years in machine tool history.

The Cincinnati Planer Company, makers of planers exclusively, report that they have had one of the best years in their history and are delighted with the outlook for 1903, which promises to even surpass all previous years. Orders are coming from all parts of the country, representing almost every State in the Union, and show a very healthy condition of this branch of trade. They are adding a new 150 horse-

power Corliss engine, as the one formerly used was too small for their present equipment.

Cincinnati Machine Tool Company make a specialty of fine upright drills. They report business for the year in every way satisfactory and their books show a considerable gain over previous years, this increase being in line with almost all other shop experiences, almost entirely from domestic sources. Their tools have found special favor in the different markets where they have been shipped and in most cases they have been favored with duplicate orders from the same manufacturers. They have under consideration several different plans for expansion.

Smith, Myers & Schnier, builders of engines and saw mill machinery, report 1902 the best year they have had in their experience. The greatest activity, possibly, is in the demand for veneer mills, though all sorts of sawing mill machinery have been very active. One order was received from Mexico for a band mill outfit costing \$4000, two veneer mills to be shipped to Chicago costing \$3000 and many smaller orders from various sections of the country. There is no difficulty in securing orders, but the matter of immediate delivery is almost an impossibility under present conditions. They were offered an order for a band mill outfit costing about \$12,000, which must be ready and shipped in two months' time, but as they had such a volume of business already booked it was necessary to decline this order. They feel very well pleased with the outlook and hope for a continuance of prosperous times.

The J. A. Fay & Egan Company report business in as good condition as is possible, with very generous orders from all parts of the country. They are just distributing some new sectional catalogues which they expect will prove trade catchers. They have now on the market a new band resaw and band rip saw machines, and also their new planer, No. 3, which latter machine is made to accommodate timbers of very large dimensions. They have lately booked a large order, amounting to \$12,000, from Brussels, Belgium. Some time since rumor had it that this company would remove to more commodious quarters at Bond Hill, but as yet they have perfected no plans for the change.

The John H. McGowan Company, builders of pumping machinery, are as busy as they can desire. They are finding a ready market for their output in the Southern States, business in that section of the country being unusually brisk. They have now under construction for Gadsden, Ala., a 3,000,000-gallon improved compound pump. The Chattanooga Furnace Company are opening up new mines at Cartersville, Ga., and have made contracts for large pumping machinery. They have just shipped a 3,000,000-gallon pump to Fairmount, W. Va. The Valley Iron Works of Battelle, Ga., have also contracted for large pumping machinery. They have made numerous smaller shipments for Texas and Louisiana trade. They are anticipating a good season of trade from the Louisiana sugar belt on account of the exceptionally good sugar crop. During the past year they, with others, have experienced considerable trouble and delay in securing supplies, but the outlook seems brighter and bids fair to soon assume its normal condition.

The J. M. Robinson Company are very much pleased with the aspect of trade, and are moving along nicely, handling their orders, which are general, very well. They are adding to their equipment as fast as is possible, and report no trouble in securing all the material and supplies needed. Trade with them assumes even a brighter look than at the beginning of 1902.

The Bickford Drill & Tool Company report that January of this year opened up with a greater volume of business in sight than the year previous. During the year past they have increased their output by the addition of new jigs and additional equipment. They have recently placed on the market their new Bickford radial made in 4, 5 and 6 feet sizes, plain, half universal and full universal styles. Domestic business is general from all parts of the country, and foreign business seems to be better. They expect their output this year will be considerably in advance of last, especially as the railroads, who are important factors, are buying more heavily than for some time.

The Bollman Wilson Foundry Company are doing a very good business, notwithstanding the fact that they are somewhat hampered by the striking core makers. They report that they are still having some trouble in securing the necessary coke and iron for their foundry work, but anticipate an early settlement of their difficulties in this direction. They are soon to add 200 feet to their Norwood foundry, the building to be of steel and brick construction, to be used as office and pattern rooms. They feel that the prospect for a good general business is brighter now than it was last year at this time.

The Sebastian Lathe Company of Covington, Ky., builders of 9 and 15 inch foot and power lathes, feel that the year of 1902 has dealt very fairly with them, and the amount of their output will compare favorably with any previous year of their existence. The company are continually improving their machines, and have brought out a number of new features recently that have proved very good.

New York.

NEW YORK, January 28, 1903.

Pig Iron.—Buying continues on a moderate scale, although more interest is being shown in the market. There have been further purchases of foreign Pig, including one cargo of about 3000 tons of Middlesbrough by a large Virginia consumer. The freight question is becoming troublesome, in view of the large number of charters which are being made to carry Bituminous Coal, notably to New England ports. We quote for prompt to early delivery: No. 1 X Foundry, \$24 to \$24.50; No. 2 X Foundry, \$22.25 to \$22.60; No. 2 Plain, \$21.50 to \$22. Tennessee and Alabama brands, in New York and vicinity, No. 1 Foundry, \$24 to \$24.50; No. 2 Foundry, \$22.75 to \$23.25; No. 3 Foundry, \$21.75 to \$22.25.

Steel Rails.—Outside of a few fair sized orders for Light Rails, little new business is reported. Importers of Steel Rails report that the situation does not favor further purchases abroad. The German mills, which have been the lowest sellers all along, are now full of work for some time to come, so that they cannot make shipments before May. Prices have hardened and are now more closely on a parity with English quotations, which have been on a higher level all along.

Cast Iron Pipe.—The foundries are so rapidly filling their order books that it would not be surprising to see prices stiffen materially. The month has been a most remarkable one in the volume of business, in marked contrast with the usual January record. Inquiries continue numerous. No specially heavy contracts are reported for the past week. We continue to quote \$34, gross ton, for 6 to 12 inch, tide-water.

Finished Iron and Steel.—The most important contract in the Structural line placed since our last report calls for about 4500 tons for the buildings of the new plant of the International Steam Pump Company, at Harrison, N. J., which is believed to have been secured by the American Bridge Company. The outlook in this line continues as bright as previously reported, but increasing difficulty is found in meeting necessary conditions as to time for completing the desired work. Deliveries of Structural Material are getting better, but the fitting shops are crowded to their capacity. The supply of Angles under 3 inches has recently been increased to such an extent that some cutting is reported. Business in Plates is increasing. Some of the Eastern mills have lately been securing orders in the West which the Western mills have been unable to handle. Eastern Plate capacity will be increased toward spring by the completion of the new mill of the Lukens Iron & Steel Company, on which the work of construction is being pushed as rapidly as possible. Fuel is still scarce in the East, interfering with mill output. At the Bar Iron meeting in this city last week a strong effort was made to advance prices, but the conservative element prevailed by a slender majority. Report has it that those who are anxious to put prices up have not changed their views, but hope in the next week or two to induce their fellow manufacturers to work up prices at least \$2 per ton. We quote at tidewater as follows: Beams, Channels and Zees, 1.75c. to 2c.; Angles, 1.75c. to 2c.; Tees, 1.80c. to 2c.; Bulb Angles and Deck Beams, 1.90c. to 2.25c. Sheared Steel Plates are 2.10c. for Tank, 2.20c. for Flange, 2.35c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.80c. to 1.90c.

Old Material.—The inquiry from Eastern mills is not only better, but some sales are being made to buyers who have been holding out for a long time awaiting lower prices. Dealers are greatly interested in the possibility of an advance in the price of Bar Iron, which they believe will have a good effect on the prices of Old Material. Cast Scrap continues quiet. We quote, f.o.b. cars, vicinity of New York, per gross ton:

Old Iron Rails.....	\$22.50 to \$23.00
Old Steel Rails, long lengths.....	20.50 to 21.00
Old Steel Rails, short pieces.....	18.75 to 19.25
Relaying Rails, heavy sections.....	29.00 to 30.00
Relaying Rails, lighter sections.....	32.00 to 33.00
Old Car Wheels.....	20.75 to 21.25
Old Iron Axles.....	28.00 to 29.00
Old Steel Car Axles.....	24.50 to 25.00
Heavy Melting Steel Scrap.....	18.75 to 19.25
No. 1 Railroad Wrought Scrap Iron.....	20.00 to 21.00
Track Scrap.....	18.00 to 18.50
Wrought Pipe.....	14.00 to 15.00
Ordinary Light Iron.....	11.00 to 12.00
No. 1 Machinery Cast Scrap.....	19.00 to 20.00
Stove Plate.....	14.00 to 15.00
Wrought Turnings, delivered at mill.....	16.50 to 17.00
Cast Borings, delivered at mill.....	10.00 to 10.50

On February 1 the Denver, Col., office of the Carnegie Steel Company, American Steel Hoop Company and National Steel Company, in charge of E. M. Sparhawk, will be removed from 805 and 806 People's Bank Building, to 101 and 102 Boston Building.

Metal Market.

NEW YORK, January 28, 1903.

Pig Tin.—Speculators have been favored during the last week to a slight degree and taking advantage of the situation they advanced prices rapidly. The advance has been steady and at the close to-day prices were higher than they have been for many months. Business in this market was, however, rather slight and there was considerable comment in the trade over the smallness of orders coming from the interior. Large consumers are also buying on a very limited scale. The only real excuse which can be given for the advance is the announcement coming from Holland to the effect that to-morrow's Banca sale will be reduced from 72,000 slabs to 55,900. This would make a reduction of about 500 tons. This shortage is due to a strike which has existed among the dock laborers during the last few weeks. Arrivals thus far this month amount to 2545 tons, while it is figured that about 2680 tons are afloat. At the close to-day the market for spot in January ranged from 29.10c. to 29.40c. February to May was quoted 28.95c. to 29.50c. The London market closed £132 10s. for both spot and futures. An early cable this morning announced that there had been sales in London at £133 10s.

Copper.—The market is firm, prices considerably higher, but very little activity is shown by purchasers. There has been a steady demand of small proportions, indicating that consumers are still buying only according to their immediate necessities. No opposition is being shown, however, to the bull movement, and the operators who have this work in hand have maintained an upward tendency throughout the entire week. To-day's closing prices were as follows: Lake and Electrolytic, 12.37½c. to 12.62½c.; Casting, 12.25c. to 12.50c., and Standard, 11.87½c. The London market advanced to £54 12s. 6d. for spot, and £54 16s. 3d. for futures. Best Selected advanced 5 shillings to £59. Exports still show very lightly, amounting to 7910 tons so far this month.

Pig Lead.—No official announcement has been made as yet regarding the long projected merger. There is no doubt in the trade that the principals are carrying the matter through successfully, and that it is only the perfecting of minor details which prevents an announcement of the consummation. The market here was dull and unchanged. The official quotations of 4.12½c. for spot and 4.10c. for futures still hold. The St. Louis market shows weakness in Soft Missouri, which is now quoted 3.97½c. to 4c. London has declined to £11 8s. 9d.

Spelter.—The market is without change as to price and quiet as far as demand is concerned. The spot quotation named here is 4.90c. to 5c. St. Louis is unchanged at 4.80c. and London has advanced a shade to £20 5s.

Antimony.—Is unchanged. Cookson's is quoted at 8½c. to 8¾c., Hallett's at 7c. to 7¼c. and other brands at 6¼c. to 6¾c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—In sympathy with the decline in London this market has declined to \$47 per flask of 76½ lbs. each in lots of 50 flasks or more. London has declined to £8 12s. 6d.

Tin Plate.—Quotations are unchanged, being based on present official prices of \$3.60 per box of 14 x 20 100-lb. Cokes, f.o.b. mill, and \$3.79, New York delivery. These prices, it is understood in the trade, will hold until April. The Swansea market advanced 3 pence, is quoted 12 shillings.

Iron and Industrial Stocks.

While transactions in industrial stocks have been in only moderate volume during the week, the undertone has been fairly strong and in some instances advances have occurred, notably in National Enameling preferred, Pressed Steel common, Tennessee and United States Steel, both common and preferred. American Bicycle stocks, on the other hand, have gone to very low prices, common selling at 12½ cents per share and preferred at 37½ cents.

The annual report of the Pressed Steel Car Company, just out, shows earnings of over 21 per cent. on the common stock, after all charges for depreciation, preferred stock dividend, &c., have been deducted.

International Steam Pump Company.—The debenture bonds recently authorized are \$1000 gold 6 per cents, dated January 1, 1903. They are due January 1, 1913, but are subject to call on or after January 1, 1908, in any amounts, at 105 and interest; they are also convertible into common stock at any time, dollar for dollar, at option of holders; interest payable January 1 and July 1 at the office of the Colonial Trust Company. The total authorized issue is \$3,500,000; present issue, \$2,500,000. No prior liens are outstanding and no mortgage is to be created without including the debentures. The circular to the shareholders regarding

the issue says: "The growth of the business has so far exceeded expectations that it has become necessary to greatly enlarge and concentrate its existing plant and to build new factories to meet the changed conditions and provide for further extensions. The volume of business for the year ended October 31, 1902, is about double the amount of business of the constituent concerns for the year ended at the formation of the company. On October 31, 1902, there were \$5,686,067 of orders in hand. The net profits for the three years have averaged 6.95 per cent. on the common stock over and above all fixed charges and contributions to the sinking fund, and after allowing amply for depreciation. A tract of land has been purchased and work begun on a plant at Harrison, N. J., which will be by far the largest pump works in the world. The works of the Snow Company at Buffalo are being changed and enlarged with the view of concentrating a large part of the water works business at that point, and the capacity of the Blake Factory is also being increased by the erection of new factory and equipment. For these purposes, as well as to provide funds to pay for improvements already made, for which the company have temporarily borrowed about \$700,000, the directors have authorized an issue of \$3,500,000 debentures. It is intended to issue not exceeding \$2,500,000 of these debentures at this time and then only from time to time as the money is needed. This amount of \$2,500,000 has been underwritten at the price to the company of par and interest less 1½ per cent. commission, subject to the right of the stockholders to subscribe for their proportion of these debentures at par."

The annual report of the Monongahela River Consolidated Coal & Coke Company of Pittsburgh showed that undivided profits for the year were \$180,036, as compared with \$495,687 the year previous and \$361,374 for the company's first year of operation ending October 31, 1900. Net earnings were but \$250,000 less than the preceding year, while the increased charge for maintenance and depreciation of river craft was of itself sufficient to account for the comparative decrease in the sum available for surplus. Probably the most conspicuous feature of the report was the fact that while the current debt was decreased over \$1,000,000, certificates of indebtedness to the amount of \$2,060,000 were issued.

Dividends.—The Cambria Steel Company have declared a dividend of 75 cents per share, payable February 14.

The Colorado Fuel & Iron Company have declared the regular semiannual dividend of 4 per cent. on preferred stock for six months ending December 31, 1902, payable February 20. Books close January 31; reopen February 21.

The Westinghouse Brake Company, Limited, of London, England, have declared a semiannual dividend of 10 per cent., which is the rate declared for some time past, and an extra dividend of 5 per cent. The capital of the company is \$2,000,000, and a controlling interest in it is held by the Westinghouse Air Brake Company of Pittsburgh, as one of their treasury assets, so that the latter concern will receive the bulk of the disbursement.

The directors of the Wheeling Steel & Iron Company, Wheeling, W. Va., will soon hold a meeting to take action on the annual dividend. The general expectation is that a stock dividend of 25 per cent. will be declared and an 8 per cent. cash dividend set aside for 1903, 2 per cent. payable quarterly. There have been some small sales of stock at 175.

The directors of the Fore River Ship & Engine Company have passed the January semiannual dividend on the preferred stock, of which \$1,920,000 is outstanding. The company contracted a floating debt to an amount exceeding \$900,000. To retire the floating debt and furnish working capital an issue of \$1,250,000 of first mortgage bonds has been made.

Press dispatches from Ironton, Ohio, state that the Kelly Nail & Iron Company have declared an annual dividend of 100 per cent. on a capitalization of \$225,000, payable at the discretion of the president.

An Injunction Against the Bridge Workers' Union.

—PITTSBURGH, PA., January 28, 1903.—At Pittsburgh the Brown Hoisting Machinery Company have secured an injunction from the courts restraining officers and members of the International Association of Bridge and Structural Iron Workers from interfering in any way with the workmen of the plaintiff company at the Isabella blast furnaces of the American Steel Hoop Company. The plaintiff company have the contract for building bridges at the furnaces, but on account of some trouble among the workmen, others were brought from Cleveland. It was testified that by threats and force the members of the defendant association drove the imported workmen away. It was alleged that the workmen would be met by the strikers, who would attempt to persuade the plaintiff's men to cease work, and when they refused violence was used.

Cleveland Machinery Market.

CLEVELAND, OHIO, January 26, 1903.

Cleveland dealers and manufacturers say that the demand for new machinery has opened surprisingly well from the very first of the year. Usually business is somewhat slack the first two weeks of the new year, as people do not generally decide on what they want until after the annual meetings. This year there appears to have been little or no lull at that time, indicating a feeling of certainty for the new year and a demand for increased facilities, which could not be delayed. Although, as has already been detailed in these columns, nearly all of the leading manufacturers greatly increased their facilities last year, many of them are preparing to make still farther additions the coming spring. In a number of cases it appears that the people did not figure far enough ahead and did not make their additions large enough to take care of the increased business now in sight. Unquestionably 1903 promises to be fully as good as 1902, if not better. Beyond this year few are willing to predict. One feature which seems to have quite an important bearing upon the future machine tool business is the fact that a great many leading concerns are experimenting with, or have adopted the new high speed tool steel cutting tools which have lately been introduced. The use of these tools effects a great economy in the time of doing work, but it necessitates the use of a heavier class of machine tools than heretofore thought necessary. Still there is a net saving, and many progressive concerns are throwing out their light machinery and installing heavier.

Investigation shows that the reports published in the daily newspapers to the effect that many of Cleveland's leading manufacturing concerns may be obliged to shut down owing to the fuel shortage, has been greatly exaggerated. Cleveland is feeling the scarcity of fuel in common with other large cities, particularly those of the West, but there are no indications that any of the leading manufacturers will be forced to shut down. Some of the smaller ones may feel forced to do so, owing to inability to pay the high prices demanded for fuel, but there is plenty of coal for those willing to pay the price, and the majority are not worrying in the least since they have contracts with coal companies.

The automobile show at New York last week called attention to the remarkable standing which this city has acquired in the new industry. No less than eight large factories in this city are now at work exclusively on automobiles, and the output in Cleveland will probably not run far short of 5000 machines, including every known type and style. Nearly all the local makers have sold out their outputs for the coming season. The Winton Motor Carriage Company alone have contracts for over 750 vehicles at \$2500 each. Cleveland factories are shipping automobiles to every civilized country on the globe.

The Cleveland Stampings & Tool Company are now occupying the factory just vacated by the Snyder-Hughes Company, in addition to their old plant. They have moved their offices into the old Snyder-Hughes offices and now have over double their former floor space. They will install some new machinery to increase their facilities.

The Atlas Car & Mfg. Company say they have more business than they can attend to and recently turned over a good contract to a competitor. Among other contracts for large equipments they are shipping a number of 30-ton standard gauge steel test cars to a new Eastern steel plant.

The Kilby Mfg. Company have closed a contract for a beet sugar plant for the Longmont Sugar Company, Longmont, Col. The plant will have a capacity of 600 tons per day and the buildings will be large enough to double the capacity. This makes the sixth contract for complete sugar plants, which is about all they can build during the coming year. As is usual, they will furnish buildings, engines, boilers, generator for lighting and a complete machine shop equipment.

E. H. Dyer & Co. have the contract for a beet sugar plant for the Morgan Construction Company, Ft. Morgan, Col. They will furnish the complete equipment, including sugar machinery, engine, boiler, lighting plant and machine shop.

J. Dyson & Sons, manufacturers of drop forgings, are erecting an addition which will double their former floor space. The building is 120 feet long by 50 feet wide. They will install several large lathes for rough turning forgings. Later they expect to add to their equipment of drop hammers. They are preparing plans for a power house and will shortly be on the market for an engine and a generator.

One of the best contracts ever captured by the Cleveland Punch & Shear Works Company was that of the Great Lakes Engineering Works of Detroit. All of the leading punch and shear manufacturers, as well as several from abroad, were after this contract. The list of tools includes the following: Six 49-inch style G punches, five 25-inch style G punches, two 36-inch style G punches, two 36-inch style G shears, one 30-inch style X punch for heavy work, one 21-inch I-beam coping punch, two horizontal punches, three 20-foot arm radial drills, one No. 1 bar shear, one 26-foot plate planer, with jacks; one 26-foot plate planer, with butt planer at-

tachment; one large bending machine for 8-inch beams, one bending machine for 24-inch beams and one set of plate straightening rolls. They recently shipped the Lake Shore & Michigan Southern Railway Collinwood shops a 26-inch E punch and the Erie City Iron Works, Erie, Pa., a set of 12-foot bending rolls.

The Cleveland, Painesville & Ashtabula Railway will erect a power plant near Painesville and have two horizontal cross compound Cooper Corliss engines of 600 horse-power each and three 300 horse-power water tube boilers. The General Electric Company will furnish the electrical equipment.

The C. O. Bartlett & Snow Company are furnishing a Rowe feeder system for burning powdered coal to the American Smelting & Refining Company, Salt Lake City. They are furnishing coal drying and conveying outfits to the following: Southwestern Portland Cement Company, White Cliffs, Ark.; Illinois Central Railway, Chicago; St. Louis Portland Cement Company, St. Louis; Egyptian Portland Cement Company, Detroit, and the Colonial Construction Company, Hudson, N. Y.

The foundry of the Macbeth Iron Company on West Center street was almost totally destroyed by fire last week. The fire started in the cupola of the fire shaft and was due to overheating. The new machine shop recently erected was not damaged. The company will rebuild.

The Schneider Machinery Company, dealers in new and second-hand machinery, have moved from 126 Champlain street to large quarters at 28-30 Michigan street. They are taking up the sale of boilers and engines.

The S. M. York Machinery Company have changed their name to W. M. Pattison Machinery Company. The capital stock is \$50,000, and the officers are W. M. Pattison, president; Arthur Jones, vice-president; W. H. Smith, treasurer; C. N. Hess, secretary, and Daniel Bigley, manager. The change signifies no change in the management. S. M. York died several years ago, and the business was sold to the parties above mentioned. They report that business in the Cleveland district has opened up surprisingly well, and there are prospects for another very heavy season.

George H. Bowler & Co. have leased the factory formerly occupied by the Cleveland Crane & Car Company, Wason street, and will utilize it as a warehouse in the sale of second-hand heavy machine tools, engines, boilers, &c. Their Frankfort street warehouse will be fitted up for the sale of new machine tools, in the sale of which they will engage extensively in the future. They are negotiating to handle several new lines in this district.

The Bosworth-Holding Company, South Water street, are handling a line of new goods in addition to second-hand machinery. They have taken the agency in this section for the planers built by the Mark Flather Planer Company, Nashua, N. H.; lathes, P. P. Silk Machine Tool Company, Cincinnati; millers and universal cutters and grinders, Oesterlein Machine Company, Cincinnati, and lathes, the Sebastian Lathe Company, Cincinnati.

F. M. Rogers of Forest and S. Welling of Columbus have bought up the old factory of the Lima Steel Castings Company at Lima. They will rebuild the entire plant and will engage in the manufacture of gas burners, stove pipe and tinners' supplies. Work on the building is to start at once.

The Cleveland Automatic Stoker Company, incorporated recently, have elected W. F. Malone, president; Frank Gorman, secretary, and C. R. Clapp, treasurer. The company have \$200,000 capital stock, and will erect a factory in Cleveland for the manufacture of a new automatic stoker.

The Mansfield Engineering Company of Mansfield have completed the erection of a new power plant with a view to driving all machinery by independent motors. They have commenced work on a foundry building, 75 x 170 feet, and they are contemplating the erection of a new structural shop.

The Rotary Woven Wire Fence Company of Columbus have been incorporated with \$300,000. Officers are Adolph Boers, president; G. Langer, vice-president; G. Yeager, secretary-treasurer. The company will erect a factory in Columbus for the manufacture of a patent wire fence, also for the manufacture of the machinery to equip other plants.

F. A. Pope, Cleveland representative of the Buckeye Engine Company of Salem, has been elected to the directorate of the company. The Davis interests in the company have recently been acquired by other stockholders.

The Columbus Iron & Steel Company have increased their capital stock from \$500,000 to \$750,000. Col. C. H. Marting is president and W. W. Marting, secretary of the company. They are making a number of improvements.

The Van Buren, Beck & Marvin Company of Findlay, Ohio, have completed their organization by electing J. C. Van Buren, president; Gloyd Marvin, secretary, and W. T. Beck, superintendent. They will commence work at once on a factory, 50 x 116 feet, for the manufacture of the Van Buren ditching machine.

The improvements contemplated by the Ohio Iron & Steel Specialty Company of Cuyahoga Falls, comprise the erection of buildings for a 10-inch Belgian mill, an 18-inch roughing mill, a scrap mill, two sand bottom scrap fur-

naces and one wash heat furnace. The mill will have the best modern equipment and will be enlarged as the requirements of the trade in the specialty end of the business demand. Sufficient ground has been secured for future growth. The improvements will be in charge of James Ring, a well known Pittsburgh mill engineer.

The Sheet Metal Mfg. Company of Niles have increased their capital stock from \$20,000 to \$40,000, and they will increase the facilities of their sheet metal ceiling department. They have been awarded a contract for metal ceilings throughout 14 stories of the new Benton block in New York City.

The New York Machinery Market.

NEW YORK, January 28, 1903.

Business is good. Small orders are plenty and some nice large ones are keeping machinery merchants in a most excellent frame of mind. From all outward indications the month of January is going to prove a fine one. There is a unanimity of opinion in the trade that this year commenced very much better than did its predecessor. That it opened a good deal stronger than was generally expected, there is no doubt. The last week brought forth several new projects which will require mechanical equipment of all sorts. The inquiry of the week was very good. As for orders, the largest machine tool order of the year has probably been decided upon, although we have not been able as yet to obtain details as to the awards. The purchasers referred to are the American Locomotive & Machine Company of Montreal. As we have previously stated, this concern are buying something like \$300,000 worth of machine tools.

Representatives of the leading machinery houses throughout the country have been in Montreal upward of a week with a view of expediting the work of the officials in deciding as to which tools they want. We hear that the boys have concluded negotiations, broken camp and are now returning, some elated and others disappointed. It is said, however, that the job was split up pretty well and this fact ought to please the majority, as there was a good deal of danger of one concern taking the whole proposition on a sort of brokerage basis.

The railroads are very active in their purchasing departments. They are picking up a good many tools constantly and the impression is abroad that some of the lines are preparing for exceptionally large purchases this year. The phenomenal freight traffic on all the roads has shown the inadequacy of their equipment. There is no doubt that the big systems at least will strain every effort to increase their equipment, and this will add to the rush that the locomotive and car shops throughout the country are now battling with. The locomotive and car building and repair capacity of the various roads will have to be increased very materially this year, despite the great strides recently made in this direction.

There is a report current to the effect that the Baltimore & Ohio Railroad intend building new car shops at Riverside, Md. J. E. Griener, engineer for the company at this point, advises us that there is nothing in this report and that it is only intended to repair the roof of the Royal street station. Parties who have followed up Baltimore & Ohio affairs state that the work at the Royal street station may be limited to the line suggested by Engineer Griener, but that the road has a new car shop project under way and that while Riverside may not be the location decided upon, the shops are likely to go to some point in that vicinity.

The announcement of the incorporation of the L. C. Smith & Bros. Typewriter Company, at Albany, with a capital of \$5,000,000, which was made this morning, recalls recent talk in the machinery trade to the effect that something was soon to develop along the lines of a large new typewriter plant. The Union Typewriter Company, it will be recalled, absorbed a number of the largest typewriter companies, including the Smith-Premier Typewriter Company of Syracuse. L. C. Smith, the former head of the Smith-Premier Company, became a director in the Union Company. He has now resigned this post, and we understand that the entire Smith contingency have resigned from the Smith-Premier Company. The general impression in the trade is that the new company intend erecting a large plant and competing actively with the consolidated company.

There is to be a meeting of the promoters of the proposed consolidation of emery wheel manufacturers tomorrow morning at the Fifth Avenue Hotel, this city. Frank M. Atterholt of Akron, Ohio, and Josiah B. Epsy of Springfield, Ohio, are the prime movers in the project. Some 20 concerns have been invited to join the movement. It is intended to actually consolidate the concerns into one big company. Previous efforts to get these concerns together have been along the lines of an association, an organization of this sort now being in existence.

H. M. Bean of Camden, Maine, who was reported to be at the head of a new company intending to build a \$1,000,000 shipyard, advises us that the report is incorrect. There was, however, a merger of the interests controlling various

parts of the "Crawley" fleet of wooden vessels. The value of these vessels is \$995,000, and it is intended to issue \$1,500,000 worth of stock and expend a portion of the new capital in building one or two wooden vessels.

The B. F. Sturtevant Company, Boston, Mass., have just placed in operation their new foundry at Readville, Hyde Park, Mass. This marks the completion of the first portion of the great new works which the company are erecting at Hyde Park. Several months will be required for the transfer of the entire plant from Jamaica Plain.

The Myrick Machine Company of Olean, N. Y., are preparing plans for an extension to their plant. They are builders of the Eclipse gas engine, steam engines, air compressors and special machinery. Alfred and E. M. Tothill are the proprietors.

The Willoughby Company of Utica, N. Y., are equipping a plant for the manufacture of automobiles, carriages and sleighs. The plant, which is being added to, was formerly operated by the Utica Carriage Company. E. A. Willoughby is the president of the company and E. M. Galle superintendent.

The Genesee Launch & Power Company, of which A. S. Lane is secretary and treasurer, were recently incorporated with a capital stock of \$25,000. The organization will be ready for business about March 1. They will erect a plant at Rochester, N. Y., for the production of gas and steam engines, electric motors and dynamos, and a complete line of yachts and launches and their fittings. They have given an order to the W. P. Davis Machine Company of Rochester, N. Y., for a large equipment of lathes, planers, shapers, boring machines, drills, grinders and wood working machinery.

The Lindstrom Boehm Machine Company of El Campo, Texas, wish to hear from builders of engine lathes, as they contemplate purchasing.

The Buffalo Belting Company, Chandler street, Buffalo, N. Y., expect to begin operations this week. The greater part of the machinery is in place, and a large amount of raw material is on hand. The company will manufacture belt conveyor systems, and are located in the same building as the Buffalo Weaving Company. Belts from 1 to 60 inches and of any thickness can be made by the present machinery. The company also make heavy sheets and strips of cotton goods for use between the cars on vestibuled trains.

De Witt C. Haddock of Oneida, N. Y., has a project on foot looking toward the construction of a hydraulic plant. He proposes utilizing the Stockbridge Falls, near Oneida, and installing an initial plant of 600 horse-power capacity.

The Fenn-Sadler Machine Company, Hartford, Conn., who manufacture a bench lathe of new design, build special machinery, tools, models, &c., and who have been established at Hartford for some time, have recently incorporated their business under the same name, with a paid in capital of \$10,000. The officers are: Wilson L. Fenn, president and treasurer; Joseph F. Sadler, vice-president; D. Frank Conkey, secretary.

The Fritz Medal.—At a meeting of the Fritz Memorial Committee, held in New York on January 23, the announcement was made that the four national engineering societies have appointed the following as their representatives on the Board of Trustees of the Fritz Medal:

American Society of Civil Engineers.

J. James R. Croes, New York.....One-year term.
Robert Moore.....Two-year term.
Alfred Noble, New York.....Three-year term.
Charles Warren Hunt, New York.....Four-year term.

American Institute of Mining Engineers.

E. E. Olcott, New York.....One-year term.
E. G. Spillsbury, New York.....Two-year term.
James Douglas, New York.....Three-year term.
Charles Kirchhoff, New York.....Four-year term.

American Society of Mechanical Engineers.

Gaetano Lanza, Boston, Mass.....One-year term.
John E. Sweet, Syracuse, N. Y.....Two-year term.
Robert W. Hunt, Chicago, Ill.....Three-year term.
S. T. Wellman, Cleveland, Ohio.....Four-year term.

American Institute of Electrical Engineers.

Arthur E. Kennelly, Cambridge, Mass.....One-year term.
Carl Hering, Philadelphia, Pa.....Two-year term.
Charles P. Steinmetz, Schenectady.....Three-year term.
Charles F. Scott, Pittsburgh, Pa.....Four-year term.

A preliminary organization of the Board of Trustees was effected and a committee was appointed to prepare the way for a permanent organization.

Dallett & Co., 201 Walnut place, Philadelphia, Pa., iron and steel, railroad supplies and electrical equipment of all kinds, have just issued their January, 1903, bulletin to the trade.

Trade Publications.

Crane's List.—The mail order department of A. M. Crane & Co., Incorporated, Chicago and New York, has inaugurated its entrance into the active field of competition for "everything in iron and steel" by the publication of "Crane's List." Information of interest to consumers of iron and steel and their products is given. The "List" is the initial number of what will hereafter be a monthly publication. The salutatory, entitled "Team Work," relates to the personnel of the firm. German structural steel shapes come in for prominent notice, as the firm have been doing a large importing business, and will probably increase such trade during the congested condition of American mills. The "List" contains tables of dimensions and weights of finished steel products, and dwells specifically upon certain specialties for which the firm have secured the agencies.

Cranes.—The hand and electric traveling cranes built by Maris Brothers of Philadelphia are particularly noticeable for the small amount of head room necessary for their operation. Another strong point is the ease and precision with which they can be controlled by one man from the floor. Their hand traveling cranes of short bridge span are built of I-beams, having cast iron truck brackets strengthened by stay rods running under the beams. The truck wheels have roller bearings and turn on the axles. An automatic brake holds the load at all points. Lowering is accomplished by pulling the opposite side of the hand chain from that used for hoisting—a slight pull starts the load and keeps it going.

Shapers.—The latest pillar shapers by the Cincinnati Shaper Company are described in their catalogue just issued. In these shapers all gears and T-slots are cut from the solid metal, all bearings are amply large and all flat sliding fits are hand scraped to surface plates. The shaft bearings are long and well braced in the column casting, the rocker arm is strong and heavy, and means are provided for compensating for wear. The length of the stroke is changed from the working side of the machine by means of a crank, and its position in the 16-inch single geared shaper by means of a screw operated by removable wrench from the rear end of the machine, while in the back geared shaper this is accomplished by a hand wheel on top of the arm ram and while the machine is in motion. The tools are bold and symmetrical in outline, and ample metal has been provided to insure a rigid, powerful and accurate machine.

Variable Speed Transmission.—The Reeves Pulley Company of Columbus, Ind., have made an important change in their variable speed transmission device. This device consists of two sets of cone disks, spline mounted on two parallel shafts. One disk of each side is attached to a pivot bar which is operated by a screw in such a manner as to bring together one set of disks as the other side is forced apart, the combination of bars and pivots being such as to preserve a substantially uniform tension on the belt. The inner or adjacent sides of the disks form a V-shaped groove, in which is fitted an especially designed belt having its tractional bearing on the edges instead of the bottom, as in an ordinary belt. The operation is very simple; one set of disks acts as a driver and the other as the driven. As the driving circumference of one is increased the other is decreased, the variation being anything within the compass of the two extremes. The frame of the device heretofore has been made of steel, but the company from their experience have become convinced that a cast iron frame is infinitely more solid and satisfactory, and they have therefore adopted that for their present construction.

Water Softening and Purifying.—A very handsome catalogue has been issued by William Scaife & Sons Company of Pittsburgh, illustrating and describing the softening and purification of water by the Scaife-We-Fu-Go process. The impurities found in water and which tend to form scale are discussed at some length, as is also the fuel loss resulting from scales of different thicknesses. The process here described is a chemical one in which the impurities are removed from the water by means of chemicals before the water has entered the boiler. For most waters caustic lime and soda ash are the only chemicals here employed, although occasionally the company use other reagents when they discover that the impurities of the water supply can thereby be more economically and effectively removed. The catalogue then deals with the apparatus by means of which this is accomplished, and describes several large plants in which the system is successfully employed.

Grinding Machines.—A handsome catalogue has been published by the Iroquois Machine Company, 150 Nassau street, New York, treating of their universal plain, disk, face, surface and special grinding machinery. The accuracy of these machines is insured by carefully scraped or ground bearings, and the durability by so designing as to protect all running parts from emery dust and by the use of hardened steel wherever it is necessary. The table is long enough to cover the ways and protect them from every dust in all positions within the work expected of the machine, and the top

of the bed is inclosed to protect the feed mechanism. All the bearings are oiled from the outside through self closing oil hole covers. The travel of the table may be shortened to $\frac{1}{2}$ inch, and still reverse automatically and with the same degree of accuracy as on a longer stroke. The table is guaranteed to reverse within 0.001 inch of the same place at each end of the stroke.

Mechanical Stokers.—The Little Giant Stoker Company of Chicago have prepared a pamphlet describing their mechanical stokers. This stoker is intended for the mechanical firing of nut sized coal, screenings or slack. The coal is run from hoppers or to a feed well operated by worm gear from an engine or small motor. By means of a hand gate a thin or heavy stream of coal is led down into a cast iron chute extending somewhat over the fire grate, from which, by superheated steam, the coal is thrown against deflectors at the end of the chute, which scatter it evenly over the grate surface. The fine or powdered coal is almost immediately consumed in suspension, the heavier coal falling to the grate in a uniform steady flow, the arrangement guaranteeing a thin fire and practically perfect combustion.

Cutter Heads.—Samuel J. Shimer & Sons of Milton, Pa., have prepared a large catalogue dealing with their cutter heads for wood working machines. The company have many thousands of samples and drawings in their vaults to which they have fitted up their cutter heads since the beginning of their business 30 years ago, and any cutter head that they have at any time made can be reproduced from their records.

Machine Tools.—A general catalogue, 1903, has been received from the Brown & Sharpe Mfg. Company, Providence, R. I., which covers their entire line of machine tools and small tools and appliances. Since the last edition of this book was issued many new tools have been added to the already almost universal list built by the company. A copious index provides for ready reference.

"Benjamin is Wanted."—We have received a letter from the motor car department of the H. H. Franklin Mfg. Company of Syracuse, N. Y., stating that their sales manager, C. A. Benjamin, has escaped in New York, where he went to attend the automobile show and got loose some way. It seems that they need Benjamin in their business, and request any one seeing a good looking fellow handing out pamphlets bearing this title, "Poor Richard's Almanac," and dealing with the weather, and also with the Franklin motor car, will please send him home. The pamphlet is wittily gotten up in imitation of the great but not only Benjamin's, and imparts all needed information as to the design and construction of this motor car, and throws in many proverbs which certainly originated with one of the Franklins.

The steam pumps and air compressors built by the Hooker Steam Company of St. Louis are intended for every variety of service. They are described in a late catalogue.

The gasoline engines manufactured by the Waterous Engine Works Company, St. Paul, Minn., are described in an attractive pamphlet. This engine is constructed in a substantial manner, is simple in design and economical and reliable in operation.

A booklet describing the gasoline motors built by the Superior Gas Engine Works, West Superior, Wis., has just been issued. These motors are of a vertical two-cycle type and are used principally for marine service, but also for stationary and portable power purposes.

The coke manufacturers of this and nearby districts having orders beyond capacity of ovens, E. L. Harper, president of Big Stone Gap Iron Company, Big Stone Gap, Va., arrived at furnace from New York January 20 and prepared the first kiln of coal to coke on the ground and had the same fired within four hours after arrival. They are now producing a large quantity of very superior coke, analysis as follows: Volatile matter, 2.17; fixed carbon, 91.93; ash, 15.90; sulphur, 0.85. If other furnaces would follow the example it would soon relieve the present situation.

The Car Service Association of Youngstown, Ohio, met last week and re-elected P. A. Lynn manager. During the meeting the association reported that it had handled a total of 654,318 cars in the Mahoning Valley during 1902.

In a decision on the drawback on steel horseshoes made from imported steel billets by the Bryden Horse-shoe Company of Catasauqua, Pa., the Treasury Department makes the basis of drawback 104 pounds for each 100 pounds of exported material.

Notes from Mexico.

Mexico's Foreign Trade.

DURANGO, January 22, 1903.—The Treasury Department at Washington, almost simultaneously with the Bureau of Statistics of the Mexican Government, has published the figures covering the trade between the United States and Mexico for the year 1901. The exhibit is interesting, as it shows the remarkable growth of trade relations between the two contiguous countries and the predominant position which the northern republic holds, in a commercial sense, as compared with the rest of the world. The total value of the imports in the year 1901 from the United States reached \$32,982,250, while England, the closest competitor, supplied commodities valued at \$9,064,285; France, which is closer allied racially, \$6,124,736, and Germany, a country aggressive in extending its foreign trade, \$6,541,306. Of the total sum of the imports \$60,525,116, the United States supplied considerably more than one-half, or, to be exact, 54.49 per cent.

Manufactures of iron, steel and machinery figure largely in the imports from the United States, as might be expected, considering the active movement in railway construction and mining development.

An abstract of the various classes of merchandise imported in which readers of *The Iron Age* are interested, would include the following: Copper and its alloys—minerals and metals, \$402,835; manufactures, \$646,141. Tin, lead and zinc—minerals and metals, \$29,597; manufactures, \$124,001. Iron and steel—minerals, \$300; iron and steel for construction, &c., \$3,517,717; manufactures of the same, \$1,108,615; other metals, \$419,937; machinery and apparatus, \$5,081,294; vehicles, \$1,045,982; arms and explosives, \$1,055,025.

Exchange and Duties.

Acting under the authority of the law recently passed by Congress relative to the rate of exchange to apply to the payment of import duties, the Minister of Finance fixed the rate for the month of January at 252¼ per cent. The rate will be adjusted monthly and will be based, as this one was, upon the average of exchange on New York as sold by the local banks.

Action of Importers As to Credits.

Further action has been taken by some of the leading importers of the City of Mexico relating to credit sales. Reference to this subject was made in a recent note. At a meeting of importers and dealers in the line of drapery and dry goods held a few days ago an agreement was signed, to remain in force for one year from date, whereby the signatories bound themselves "not" to do three things, to wit: "Not to make any sales on longer credit than four months; not to allow any discount on credit sales; not to allow more than 4 per cent. discount on cash sales."

Shortly after this agreement was entered into by the dry goods men the leading daily newspaper of the City of Mexico printed this item in its business notes:

The leading hardware houses, which are mostly German, have declined to join in the coalition to limit the length of time in credit transactions to four months, proposed by the Mexico City chamber of commerce, and adopted by the dry goods houses, which are mostly French. The hardware houses allege that as prices are necessarily being readjusted to meet the high rates of exchange, they do not consider this is the proper moment to make any change in the accepted conditions of credit sales. It is calculated that the increase in prices on hardware goods will amount to fully 20 per cent. on the prices of January, 1902. During the year just ended the retail business has been considerably in excess of that of 1901, and this naturally has increased the wholesale trade of the larger houses which import directly and always keep immense stocks on hand. Collections are reported satisfactory.

Six months' credit has been the rule from "time immemorial." Any attempt to change the system is very likely to create dissatisfaction, as well as to end in failure. The hardwaremen are doing well in Mexico, despite long credits, high exchange rates and other imaginary evils. Their disinclination to join with the gentlemen of the *vara* stick indicates that they see no necessity for "hunting trouble."

United States Capital in Mexico.

The Consul-General of the United States in Mexico has published a report which embodies the results of a

year's labor to ascertain the aggregate amount of capital invested by citizens of the United States in this Republic. He places the total at \$500,000,000, gold. Without intention to question the value of the Consul's figures, it may be remarked that while it would be next to impossible to obtain exact data in an undertaking of this character, the figures given are probably as nearly correct as could be obtained by any individual in the same direction.

The Consul has found 75 establishments which he classes under the head of "manufactories, foundries," with a combined claimed capital of \$10,960,107.51; 8 houses engaged in handling machinery, agricultural implements, &c., with \$753,333.31 invested; 13 importers and exporters with \$668,222.19; 7 wholesale and retail hardware dealers with a combined capital of \$520,555.53; 3 establishments dealing in automobiles and sporting goods; capital, \$97,841.28; 5 plumbing houses, capital, \$52,444.42.

The Consul's recapitulation will be scrutinized in vain for the familiar callings of blacksmith, tinsmith and coppersmith. These industries undoubtedly exist in Mexico, but they are probably included in the exhibit under the heading of "miscellaneous," which is credited with 61 establishments, with an aggregate of \$5,047,499.77.

Industrial Notes.

According to the latest prognostications, the new plant of the Monterey Iron & Steel Company will be ready to start up next month—that is, the company hope to begin rolling rails then—for some of the departments have been in operation a considerable time, if reports are correct. William White, Jr., of Pittsburgh, the consulting engineer, is now in Monterey upon a visit of inspection. He will probably remain until the mill starts to work.

A mining supply house of the City of Mexico has lately received a shipment of 500 tons of galvanized iron from the United States. This is said to be the largest shipment ever made in one lot of this material.

J. J. D.

Late Chicago News.

CHICAGO, ILL., January 28, 1903.—(By Telegraph).—Progress is reported on the new bar iron mill combination, but the promoters are not yet willing to make public announcement of the details. It is reported that the Kokomo Steel & Wire Company may be absorbed by the United States Steel Corporation.

The South Chicago furnace, which has been out of blast for several months, was blown in on January 25. It is now running on malleable iron and is expected to produce in the neighborhood of 200 tons daily. The Mayville furnace, which has been running on foundry iron, has been compelled to blow out.

Pickands, Brown & Co., who have a number of important agencies of independent coke operators in the Connellsville district, have established an office in the First National Bank Building at Uniontown, Pa. The office force consists of a traffic manager and three assistants.

The Keystone Driller Company.—PITTSBURGH, PA., January 28, 1903.—The Keystone Driller Company, Beaver Falls, Pa., whose plant was destroyed by fire some time since, are considering the advisability of moving to some other location. At the annual meeting of the stockholders, held on January 26, a committee was appointed to co-operate with the Board of Managers in inspecting a number of locations which have been offered. This committee is to report and decide on the matter at a meeting to be held in the office of the company at Beaver Falls on February 16.

The Secretary of the Treasury has awarded to the Cramp Company of Philadelphia the contract for the construction of the building for the new Bureau of Standards in Washington. The contract price is \$159,500.

HARDWARE.

THE manner in which reductions in price are accepted in the market furnishes a forcible illustration of its condition. Very frequently when the market is wavering between strength and weakness the influence of an announcement of concessions in price on any important line is to frighten buyers off and induce a seriously diminished volume of business. In view of this manufacturers, when the market has been in an uncertain or unsatisfactory state, have frequently hesitated to make open reductions, fearing that they would result in a demoralized condition. On the other hand, declines in price when the market is in a healthful state are frequently attended by scarcely any interruption in the demand and are followed promptly by a return to a full and perhaps increased volume of business with a confident tone. The course of the Hardware market has of late furnished renewed illustrations of the operation of this principle. Reductions made in heavy lines, which may be represented in the general characterization by Wire products and Wrought Pipe, were regarded by many in the trade as perhaps the precursors of a declining market, with a stoppage of purchasing and the demoralization which has often attended the descent from high to low levels of price. In the presence of such a state of things the situation at this time is exceedingly gratifying. The lines in which these substantial reductions have taken place have, notwithstanding this fact, commanded a heavy volume of business all along and have taxed the capacity of the manufacturers to supply the demand. The interruption caused by any weakness which became evident was not continued long enough to enable manufacturers to catch up with their orders. The announcement of the lower prices when a fairly safe level was reached appeared, indeed, to embolden buyers to place orders. If the market at large, when the time comes for a shrinkage of values, can follow this course it will remove apprehensions which have been entertained of a sudden and violent break in prices and a period of depression and stagnation in trade.

The coming meetings of the retail Hardware associations, to the representative character of which as a factor in the market we referred in our last issue, promise to be of more than usual interest. Those in charge of their affairs are becoming familiar with the requirements of such meetings in order to render them interesting and profitable to the members and influential in protecting the retail trade from abuses which prevail. There is, too, a disposition on the part of merchants of position and caliber to be identified with the movement and give the weight of their influence to make it successful. There is no doubt that the meetings of the various State associations will command more attention this year than ever before, as the jobbers and manufacturers are watching the movement closely, so as to determine their relation to and treatment of it. All that is done will be closely scrutinized and the personnel of the attendance studied with a view to finding out how really representative of the trade at large are the gatherings in which trade questions of interest to all are discussed and acted upon. It therefore behooves those connected with the various associations to make every effort to be present at the annual meetings, and to secure the attendance of as many new members or prospective members as possible. It is especially incumbent on men doing a relatively large business who are pre-

sumed to take a broadminded view of things, to lend their influence to the furtherance of the movement. Their presence will add much to the representative character of the gatherings, and their experience and wisdom will contribute to the taking of wise and conservative action, such as is required in the presence of the complicated and not easy problems by which the trade is confronted. Fortunately this is the disposition which has prevailed in the associations, whose action has almost always been characterized by moderation and a judicial regard for the rights and interests of the other branches of the trade. At this time while preparations are being made for the annual conventions it is becoming that as much consideration and care as may be needed be given to the arrangement of their programmes and the securing of a large attendance. It is an opportune time, too, for nonaffiliated merchants to become identified with the movement, which is assuming such proportions and is under such leadership as to promise well for its interest and success.

Condition of Trade.

The market shows the effect of the near approach of the time when spring business will be commanding the attention of merchants. The wholesale and retail houses are evidently getting ready for a good season's trade and are putting their stocks in shape and maturing their plans. There is as a consequence a good deal of buying being done. Orders are coming in to manufacturers in increased volume and covering liberal quantities of goods. This condition of things results in part from the prevailing confidence in the stability of values for a time at least, and it also tends to strengthen such confidence. The general feeling among the trade is even more hopeful than at the beginning of the year and prices in general may be said to have a firmer tone. This is notably the case with heavy goods, which as a rule, notwithstanding some reductions which took place, are assuming a stronger tone. In some lines of staple Hardware articles, although prices are low and somewhat demoralized, there is an excellent volume of business and the trade are refusing to hold off before placing orders. Many manufacturers are suffering a good deal of inconvenience on account of difficulty in obtaining fuel and its increased cost runs up their manufacturing expenses. The difficulties and delays in transportation have their influence also in the same direction. These adverse influences, as they may be counted, contribute in more than one way to the strength of the market and tend to keep values up on the high level which they have reached. The settling in values in certain lines is not to be regretted, as in this way safer levels may be reached than by an abrupt descent. Notwithstanding the falling off in the volume of foreign shipments of Iron in its cruder forms, the increased outgo of manufactured articles is to be noted as an important feature of the situation.

Chicago.

(By Telegraph.)

The most important feature of the Hardware trade at present is the heavy tonnage of Wire and Wire products being sold by manufacturers, the corporation and independent mills alike sharing in the continued activity. Thus far in January it is believed that fully 150,000 tons of such goods have been sold for quick shipment and later delivery, but beyond this department of the trade business has been rather less than during the preceding weeks of the current month. It is notable that manufacturers of Bolts, Washers, Nuts, Rivets, Harrow Teeth and such other goods are more than

usually firm, buyers finding it almost impossible to obtain any concessions, it being claimed that the increased cost of production through higher prices for raw material and increased wages will not admit of the slightest concession. Galvanized Sheets continue to hold well at the higher prices now demanded, and Sheet Zinc continues to harden in sympathy with the activity and stronger market for Slabs. But Black Sheets have developed an easier feeling. The advance in prices of Axes some expected has not yet materialized. Manufacturers of Builders' Hardware report having secured important contracts for delivery during the spring and summer, some of the largest companies having made very important gains in the volume of business compared with the corresponding period a year ago. The jobbing trade has continued to receive very satisfactory orders for various kinds of goods for spring delivery, including Hoes, Rakes, Shovels, Spades and the usual line of Poultry Netting, Screen Doors, Wire Netting, &c. But the volume of general Hardware moving now shows a decided falling off compared with previous weeks of this year. This is regarded as a temporary lull, however, it being confidently expected that the turn of the month will witness a decided improvement. The decided moderation in temperature and wet weather may be in some respects responsible for this decrease in trade, but otherwise it is without significance, although in some quarters there seems to be a disposition to hold the higher prices for many goods responsible for the decreased consumptive demand. Manufacturers of Screws and Rivets report a very encouraging order trade received from the Missouri River section, but prices are as low and unsatisfactory as ever.

St. Louis.

(By Telegraph.)

The month closes with active demand and generally strong conditions prevailing in all departments of the Hardware market. The bulk of the business is in spring goods, but many winter specialties come in for a large share. When we consider the fact of the great abundance and high prices realized for all products of the farm, it is certainly reasonable to suppose that this will be the most important factor in shaping the spring market. Judging by the freedom shown by dealers in their early orders the spring trade outlook is most encouraging, and every indication points to its being well up to earlier expectations expressed by the jobbing trade. Builders' and Shelf Hardware continue among the leaders, and with the new St. Louis building enterprises in prospect the local consumption bids fair to exceed former seasons. Although we have alluded before to the active demand for Screens, Screen Doors, Rakes, Scythes, Hoes and all other varieties of Steel Goods, the fact will bear emphasizing again. Heavy goods come in for a better call, and the past week's business shows a very encouraging gain.

NOTES ON PRICES.

Wire Nails.—There is a steady demand which is satisfactory for the season. Specifications are coming in to the mills freely on contracts placed before the recent advance. The tone of the market is decidedly firm. Quotations are as follows:

Jobbers, carload lots.....	\$1.90
Retailers, carload lots.....	1.95
Retailers, less than carload lots.....	2.05

New York.—Local demand is moderate, owing to unfavorable weather conditions. The market is firm at the following quotations: Single carloads, \$2.10; small lots from store, \$2.15.

Chicago, by Telegraph.—There has been quite a liberal volume of business during the week, both for early and late shipment, and quite a heavy movement on old contracts. The market is firm with a confident tone. Official quotations remain at \$2.10 in carload lots, mill shipment, and \$2.20 in less than carload lots, f.o.b. Chicago.

St. Louis, by Telegraph.—The demand on the jobbers

is of a favorable order. In small lots from store the quotation is \$2.25.

Pittsburgh.—Demands for Wire Nails continues fairly good, but the larger part of the shipments now being made by the mills are on contracts placed some time since. The Wire Nail manufacturers are having great difficulty in operating their plants steadily on account of shortage of coal, and are also having trouble in making shipments owing to the congested condition of the railroads, which seems to be steadily getting worse instead of better. There is a scarcity of Wire Nails for prompt delivery on account of this unusual condition. We quote \$1.90 in carloads to jobbers, \$1.95 in carloads to retailers and \$2.05 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg is charged and for tinning Nails \$1.50 per keg extra.

Cut Nails.—The advance made on the 15th inst. affected the price of Steel Nails throughout the country and of Iron Nails east of Buffalo. No change, however, was made in Iron Nails west of Buffalo, as the price had been higher in that territory. Nails continue difficult to obtain, owing to the inability of mills to make prompt shipments. Delays also occur in transportation. The market is firm at the advance, and quotations are as follows: \$2.10, base, in carloads, and \$2.15 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Demand in the local market is comparatively light. The advance in price is fairly well maintained, although some irregularity exists because of stocks bought before the advance. Quotations for carloads and less than carloads at the advance are as follows:

Carloads on dock.....	\$2.23
Less than carloads on dock.....	2.28
Small lots from store.....	2.35

Chicago, by Telegraph.—There has been only a moderate demand, but the market has remained firm, full prices being asked and obtained. Sales are made on the basis of \$2.21½ in carload lots and \$2.31½ in less than carload lots for Steel, Chicago, while Iron Nails have continued to sell in small lots as high as \$2.50 from store, Chicago.

St. Louis, by Telegraph.—A very fair demand exists for Cut Nails. Quotation in small lots is \$2.50.

Pittsburgh.—Conditions in the Cut Nail trade are about the same as noted above in Wire Nails. Manufacturers are having trouble in getting fuel, and owing to embargoes on freight, placed by the leading railroads, are unable to make shipments satisfactorily to buyers. There is also a scarcity of Steel and prompt deliveries of Cut Nails are very difficult to obtain. The tone of the market is firm and we quote: Steel Cut Nails, \$2.10, base, in carloads and \$2.15 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days. Iron Cut Nails take 10 cents advance over Steel.

Barb Wire.—New business is being received by the mills in only fair amount, owing to the large orders placed before the advance in price. Mills are busy filling specifications on these contracts. The market remains decidedly firm in tone. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago, by Telegraph.—It is remarkable that manufacturers continue to experience a heavy trade, new contracts of moment being received almost daily. In the aggregate sales have been very large, both for quick shipment and delivery during the next two months. Galvanized is selling at \$2.70 in carload lots and \$2.80 in less than carload lots, Chicago. The market is firm for Staples, sales being made by jobbers on the basis of \$2.25 in carload lots and \$2.35 in less than carload lots, Chicago.

St. Louis, by Telegraph.—The movement in Barb Wire is on very satisfactory lines to jobbers. In small lots

HARDWARE.

THE manner in which reductions in price are accepted in the market furnishes a forcible illustration of its condition. Very frequently when the market is wavering between strength and weakness the influence of an announcement of concessions in price on any important line is to frighten buyers off and induce a seriously diminished volume of business. In view of this manufacturers, when the market has been in an uncertain or unsatisfactory state, have frequently hesitated to make open reductions, fearing that they would result in a demoralized condition. On the other hand, declines in price when the market is in a healthful state are frequently attended by scarcely any interruption in the demand and are followed promptly by a return to a full and perhaps increased volume of business with a confident tone. The course of the Hardware market has of late furnished renewed illustrations of the operation of this principle. Reductions made in heavy lines, which may be represented in the general characterization by Wire products and Wrought Pipe, were regarded by many in the trade as perhaps the precursors of a declining market, with a stoppage of purchasing and the demoralization which has often attended the descent from high to low levels of price. In the presence of such a state of things the situation at this time is exceedingly gratifying. The lines in which these substantial reductions have taken place have, notwithstanding this fact, commanded a heavy volume of business all along and have taxed the capacity of the manufacturers to supply the demand. The interruption caused by any weakness which became evident was not continued long enough to enable manufacturers to catch up with their orders. The announcement of the lower prices when a fairly safe level was reached appeared, indeed, to embolden buyers to place orders. If the market at large, when the time comes for a shrinkage of values, can follow this course it will remove apprehensions which have been entertained of a sudden and violent break in prices and a period of depression and stagnation in trade.

The coming meetings of the retail Hardware associations, to the representative character of which as a factor in the market we referred in our last issue, promise to be of more than usual interest. Those in charge of their affairs are becoming familiar with the requirements of such meetings in order to render them interesting and profitable to the members and influential in protecting the retail trade from abuses which prevail. There is, too, a disposition on the part of merchants of position and caliber to be identified with the movement and give the weight of their influence to make it successful. There is no doubt that the meetings of the various State associations will command more attention this year than ever before, as the jobbers and manufacturers are watching the movement closely, so as to determine their relation to and treatment of it. All that is done will be closely scrutinized and the personnel of the attendance studied with a view to finding out how really representative of the trade at large are the gatherings in which trade questions of interest to all are discussed and acted upon. It therefore behooves those connected with the various associations to make every effort to be present at the annual meetings, and to secure the attendance of as many new members or prospective members as possible. It is especially incumbent on men doing a relatively large business who are pre-

sumed to take a broadminded view of things, to lend their influence to the furtherance of the movement. Their presence will add much to the representative character of the gatherings, and their experience and wisdom will contribute to the taking of wise and conservative action, such as is required in the presence of the complicated and not easy problems by which the trade is confronted. Fortunately this is the disposition which has prevailed in the associations, whose action has almost always been characterized by moderation and a judicial regard for the rights and interests of the other branches of the trade. At this time while preparations are being made for the annual conventions it is becoming that as much consideration and care as may be needed be given to the arrangement of their programmes and the securing of a large attendance. It is an opportune time, too, for nonaffiliated merchants to become identified with the movement, which is assuming such proportions and is under such leadership as to promise well for its interest and success.

Condition of Trade.

The market shows the effect of the near approach of the time when spring business will be commanding the attention of merchants. The wholesale and retail houses are evidently getting ready for a good season's trade and are putting their stocks in shape and maturing their plans. There is as a consequence a good deal of buying being done. Orders are coming in to manufacturers in increased volume and covering liberal quantities of goods. This condition of things results in part from the prevailing confidence in the stability of values for a time at least, and it also tends to strengthen such confidence. The general feeling among the trade is even more hopeful than at the beginning of the year and prices in general may be said to have a firmer tone. This is notably the case with heavy goods, which as a rule, notwithstanding some reductions which took place, are assuming a stronger tone. In some lines of staple Hardware articles, although prices are low and somewhat demoralized, there is an excellent volume of business and the trade are refusing to hold off before placing orders. Many manufacturers are suffering a good deal of inconvenience on account of difficulty in obtaining fuel and its increased cost runs up their manufacturing expenses. The difficulties and delays in transportation have their influence also in the same direction. These adverse influences, as they may be counted, contribute in more than one way to the strength of the market and tend to keep values up on the high level which they have reached. The settling in values in certain lines is not to be regretted, as in this way safer levels may be reached than by an abrupt descent. Notwithstanding the falling off in the volume of foreign shipments of Iron in its cruder forms, the increased outgo of manufactured articles is to be noted as an important feature of the situation.

Chicago.

(By Telegraph.)

The most important feature of the Hardware trade at present is the heavy tonnage of Wire and Wire products being sold by manufacturers, the corporation and independent mills alike sharing in the continued activity. Thus far in January it is believed that fully 150,000 tons of such goods have been sold for quick shipment and later delivery, but beyond this department of the trade business has been rather less than during the preceding weeks of the current month. It is notable that manufacturers of Bolts, Washers, Nuts, Rivets, Harrow Teeth and such other goods are more than

usually firm, buyers finding it almost impossible to obtain any concessions, it being claimed that the increased cost of production through higher prices for raw material and increased wages will not admit of the slightest concession. Galvanized Sheets continue to hold well at the higher prices now demanded, and Sheet Zinc continues to harden in sympathy with the activity and stronger market for Slabs. But Black Sheets have developed an easier feeling. The advance in prices of Axes some expected has not yet materialized. Manufacturers of Builders' Hardware report having secured important contracts for delivery during the spring and summer, some of the largest companies having made very important gains in the volume of business compared with the corresponding period a year ago. The jobbing trade has continued to receive very satisfactory orders for various kinds of goods for spring delivery, including Hoes, Rakes, Shovels, Spades and the usual line of Poultry Netting, Screen Doors, Wire Netting, &c. But the volume of general Hardware moving now shows a decided falling off compared with previous weeks of this year. This is regarded as a temporary lull, however, it being confidently expected that the turn of the month will witness a decided improvement. The decided moderation in temperature and wet weather may be in some respects responsible for this decrease in trade, but otherwise it is without significance, although in some quarters there seems to be a disposition to hold the higher prices for many goods responsible for the decreased consumptive demand. Manufacturers of Screws and Rivets report a very encouraging order trade received from the Missouri River section, but prices are as low and unsatisfactory as ever.

St. Louis.

(By Telegraph.)

The month closes with active demand and generally strong conditions prevailing in all departments of the Hardware market. The bulk of the business is in spring goods, but many winter specialties come in for a large share. When we consider the fact of the great abundance and high prices realized for all products of the farm, it is certainly reasonable to suppose that this will be the most important factor in shaping the spring market. Judging by the freedom shown by dealers in their early orders the spring trade outlook is most encouraging, and every indication points to its being well up to earlier expectations expressed by the jobbing trade. Builders' and Shelf Hardware continue among the leaders, and with the new St. Louis building enterprises in prospect the local consumption bids fair to exceed former seasons. Although we have alluded before to the active demand for Screens, Screen Doors, Rakes, Scythes, Hoes and all other varieties of Steel Goods, the fact will bear emphasizing again. Heavy goods come in for a better call, and the past week's business shows a very encouraging gain.

NOTES ON PRICES.

Wire Nails.—There is a steady demand which is satisfactory for the season. Specifications are coming in to the mills freely on contracts placed before the recent advance. The tone of the market is decidedly firm. Quotations are as follows:

Jobbers, carload lots.....	\$1.90
Retailers, carload lots.....	1.95
Retailers, less than carload lots.....	2.05

New York.—Local demand is moderate, owing to unfavorable weather conditions. The market is firm at the following quotations: Single carloads, \$2.10; small lots from store, \$2.15.

Chicago, by Telegraph.—There has been quite a liberal volume of business during the week, both for early and late shipment, and quite a heavy movement on old contracts. The market is firm with a confident tone. Official quotations remain at \$2.10 in carload lots, mill shipment, and \$2.20 in less than carload lots, f.o.b. Chicago.

St. Louis, by Telegraph.—The demand on the jobbers

is of a favorable order. In small lots from store the quotation is \$2.25.

Pittsburgh.—Demands for Wire Nails continues fairly good, but the larger part of the shipments now being made by the mills are on contracts placed some time since. The Wire Nail manufacturers are having great difficulty in operating their plants steadily on account of shortage of coal, and are also having trouble in making shipments owing to the congested condition of the railroads, which seems to be steadily getting worse instead of better. There is a scarcity of Wire Nails for prompt delivery on account of this unusual condition. We quote \$1.90 in carloads to jobbers, \$1.95 in carloads to retailers and \$2.05 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg is charged and for tinning Nails \$1.50 per keg extra.

Cut Nails.—The advance made on the 15th inst. affected the price of Steel Nails throughout the country and of Iron Nails east of Buffalo. No change, however, was made in Iron Nails west of Buffalo, as the price had been higher in that territory. Nails continue difficult to obtain, owing to the inability of mills to make prompt shipments. Delays also occur in transportation. The market is firm at the advance, and quotations are as follows: \$2.10, base, in carloads, and \$2.15 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Demand in the local market is comparatively light. The advance in price is fairly well maintained, although some irregularity exists because of stocks bought before the advance. Quotations for carloads and less than carloads at the advance are as follows:

Carloads on dock.....	\$2.23
Less than carloads on dock.....	2.28
Small lots from store.....	2.35

Chicago, by Telegraph.—There has been only a moderate demand, but the market has remained firm, full prices being asked and obtained. Sales are made on the basis of \$2.21½ in carload lots and \$2.31½ in less than carload lots for Steel, Chicago, while Iron Nails have continued to sell in small lots as high as \$2.50 from store, Chicago.

St. Louis, by Telegraph.—A very fair demand exists for Cut Nails. Quotation in small lots is \$2.50.

Pittsburgh.—Conditions in the Cut Nail trade are about the same as noted above in Wire Nails. Manufacturers are having trouble in getting fuel, and owing to embargoes on freight, placed by the leading railroads, are unable to make shipments satisfactorily to buyers. There is also a scarcity of Steel and prompt deliveries of Cut Nails are very difficult to obtain. The tone of the market is firm and we quote: Steel Cut Nails, \$2.10, base, in carloads and \$2.15 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days. Iron Cut Nails take 10 cents advance over Steel.

Barb Wire.—New business is being received by the mills in only fair amount, owing to the large orders placed before the advance in price. Mills are busy filling specifications on these contracts. The market remains decidedly firm in tone. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago, by Telegraph.—It is remarkable that manufacturers continue to experience a heavy trade, new contracts of moment being received almost daily. In the aggregate sales have been very large, both for quick shipment and delivery during the next two months. Galvanized is selling at \$2.70 in carload lots and \$2.80 in less than carload lots, Chicago. The market is firm for Staples, sales being made by jobbers on the basis of \$2.25 in carload lots and \$2.35 in less than carload lots, Chicago.

St. Louis, by Telegraph.—The movement in Barb Wire is on very satisfactory lines to jobbers. In small lots

from store the quotations are as follows: \$2.50 for Painted and \$2.80 for Galvanized.

Pittsburgh.—A moderate amount of new business is being placed, but the mills are employed mostly in filling specifications on old contracts. Shipments are very unsatisfactory, owing to congested condition of the railroads, while the mills are not getting out a full output on account of scarcity of fuel. Prices are firm and we quote, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days: Painted, \$2.20; Galvanized, \$2.50, in carload lots to jobbers; Painted, \$2.25; Galvanized, \$2.55, in carloads to retailers; Painted, \$2.35; Galvanized, \$2.65, in small lots to retailers.

Plain Wire.—The demand is confined to a great extent to small orders, as large buyers placed their contracts last month. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....\$1.80
Retailers, carloads.....1.85
Less than carloads.....1.95

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	10	11	12	12½	13	14	15	16	17	18
Base	\$0.05	.10	.15	.25	.35	.45	.55	.70	.85	Plain.
	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	1.70	1.85 Galv.

Chicago, by Telegraph.—Further liberal contracts have been booked by manufacturers, and the market has continued firm at full prices. The jobbing trade, however, has not improved materially, but a confident tone prevails. Nos. 6 to 9 in carload lots are held at \$2 on track and \$2.10 from store. Galvanized brings 30 cents extra for Nos. 4 to 14.

St. Louis, by Telegraph.—The jobbing trade in Plain Wire continues satisfactory, with a fair volume of demand at the following quotations: No. 9 at \$2.10 to \$2.15 and Galvanized \$2.40 to \$2.45.

Pittsburgh.—Only a fair amount of new orders is being placed, the larger buyers having covered their requirements some time since. Shipments are very unsatisfactory, and the mills are badly hampered for lack of fuel. Prices are firm and we quote: Plain Wire, \$1.80, base, for Nos. 6 to 9, in carloads to jobbers, \$1.85 in carloads to retailers and \$1.95 in small lots to retailers; Galvanized 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

Hickory Handles.—The Hickory Handle Manufacturers' Association, at St. Louis, Mo., on January 10, adopted a schedule of specifications designed to insure a uniform quality of the Handles shipped by each member of the association, applicable to the list of prices adopted by the same association December 22, 1902. The Handles are now graded as follows:

Axe Handles.

Extra Quality, perfect all-white handles, except those that are extremely brashy.

Excelsior Quality, perfect handles tipped with red at one or both ends, showing not less than 18 inches white wood. Can obtain light weight with streaks.

No. 1 Quality, perfect handles of less than 18 inches white wood between head and eye, and very light weight handles unfit for Excelsior grade, with 9 inches or more white wood in the center of the handle, and with light streaks.

No. 2 Quality, best selection of imperfect handles, permitting all red.

No. 3 Quality, includes all serviceable handles below No. 2 Quality.

Shaved Axe Handles.

XXX Quality, perfect all-white handles, and such heavy handles as may be tipped with red on one end.

XX Quality, perfect handles tipped with red at one or both ends, should have 18 inches or more white wood.

X Quality, includes handles unfit for XX, permitting one-half red wood, and such white handles as contain small knots and slight imperfections.

Railroad Pick Handles.

Extra Quality, perfect all-white handles.

Excl. Quality, perfect handles, with not more than 10 inches red wood at one end.

No. 1 Quality, perfect handles that do not run over one-half the full length red wood.

No. 2 Quality, perfect all-red handles, and such as are less than one-half white wood.

A Quality, all serviceable handles below No. 2 Quality.

Coal Pick Handles.

Extra Quality, perfect all-white handles. May be tipped with red at one end.

Excl. Quality, perfect handles, with not more than one-third red wood, and only such white handles as are streaked.

No. 1 Quality, not to be more than two-thirds white wood, slight defects and streaks permitted, also all-red handles.

Sledge, Tool and Maul Handles.

Extra Quality, perfect all-white heavy handles.

No. 1 Quality, perfect handles, with one-half or more of each handle white wood, and white handles containing streaks and small defects.

No. 2 Quality, imperfect handles, all red.

Adze Handles.

Same quality as Axe for corresponding grades.

Drift and Poll Pick Handles.

Same quality as Railroad for corresponding grades.

Hammer Handles.

Running grade containing Extra, No. 1, and White No. 2.

The list prices given below have been adopted by 14 of the Hickory Handle manufacturers in the United States out of a possible 20 in all, the association claiming to produce 95 per cent. of the Handles manufactured. The list is subject to a uniform discount for domestic trade, except New England. Handles for Canada and other foreign markets take different lists. The following is the standard list now effective. It is subject to a discount to the general trade of from 50 to 50 and 5 per cent., terms 60 days or 2 per cent. discount for cash:

Turned Hickory Axe Handles.

Market and N. N. Y. patterns.	Extra.	Excl. No. 1.	No. 2.	No. 3.
Axe Handles:				
36 and 34 inch.....per doz.	\$3.75	\$2.75	\$2.25	\$1.90 \$1.60
32 and 30 inch....."	3.30	2.40	2.00	1.75 1.45
Boys' 28 and 26 inch....."	2.20	1.90	1.60	1.40 ...
38 inch....."	4.00	3.00	2.40	1.90 1.60
40 inch....."	4.40	3.25	2.50	1.90 1.60
42 inch....."	4.80	3.50	2.60	1.90 1.60
44 inch....."	5.60	3.80	2.75	1.90 1.60
Straight 36 inch...."	3.50	2.60	2.10	1.70 1.30
Double bitted 36 inch. "	3.75	2.75	2.25	1.70 1.30

Hand Shaved Hickory Axe Handles.

Octagon and oval hand shaved.	XXX.	XX.	X.
Axe Handles:			
36, 34 and 32 inch, plain end....per doz.	\$4.40	\$3.25	\$2.50
38, 34 and 32 inch....."	4.60	3.25	2.50
40, 34 and 32 inch....."	5.00	3.75	2.50
36 and 34 inch, scroll end....."	4.65	3.75	2.75
36 inch, Straight Lumberman's...."	4.40	3.25	2.50
38 inch, Straight Lumberman's...."	4.60	3.25	2.50
Broad Axe Handles.....per doz.	\$3.50		

Extra. Excl. No. 1.

Adze, House Carpenter, Ship and R. R., 34 and 32 inch.....\$4.00 \$3.50 \$2.25

Turned Hickory Pick Handles.

Surface or R. R., Mattock and Miners'.	Extra.	Excl. No. 1.	No. 2.	No. A.
Pick Handles:				
Surface or R. R., 36 in. per doz.	\$4.50	\$3.50	\$2.90	\$2.00 \$1.65
Drifting, 32, 34 and 36 in. "	3.75	3.00	2.25	... " ...
Poll, 32, 34 and 36 in. "	3.75	3.00	2.25	... " ...
Coal Miners' Small Eye, 3 x ¾, 34....."	3.25	2.15	1.75	... " ...
Coal Miners' Medium Eye, 3 x ¾, 34....."	3.25	2.15	1.75	... " ...
Coal Miners' Large Eye, 3½ x ¾, 34....."	3.25	2.15	1.75	... " ...

Turned Sledge, Tool and Maul Handles.

Sledge, Tool or Maul.	24	26	28	30	32	34	36	38	40
inch. inch. inch. inch. inch. inch.									
Extraper doz.	\$1.30	\$1.70	\$1.85	\$2.25	\$2.30	\$2.55			
No. 1....."	1.10	1.30	1.45	1.80	1.80	2.00			
No. 2....."	.80	1.00	1.10	1.25	1.40	1.60			

Hand Shaved Sledge, add 40 cents per dozen to above prices.

Turned Hammer and Hatchet Handles.

Length.	11	12	13	14	15	16	17	18	19	20	22	24	in.
Machinists'													
Hammer....doz.	65	65	65	65	65	75	75	85	90	95	1.00	1.10	
Blacksmiths'													
Hammer...."	65	65	65	65	65	75	75	85	90	95	1.00	1.10	
Riveting													
Hammer...."	65	65	65	65	65	75	75	85	90	95	1.00	1.10	
Hammer, A. & R. E....."	65	65	70	70									
Hatchet, Broad or Bench...."					75	80	1.00	1.05	1.05				
Hatchet, Shingle...."			65	65	70	70							

Handles are packed in 2 to 12 dozen cases; no charge for cases. Special prices are made for Handles made to special patterns.

Cordage.—The market for Rope is not particularly strong, owing to the declining tendency of raw material.

This also affects the placing of the usual stock orders by buyers. Trade, however, is fairly good. Manila Rope is quoted, on the basis of 7-16 inch and larger, at 11 to 11½ cents per pound. Sisal Rope, on the same basis, is quoted at 8 to 9½ cents per pound. A rebate of ¼ cent, and in some cases of ½ cent per pound, is allowed on large quantities.

Paris Green.—The market was somewhat weak and irregular last week, owing to competition. An advance in the price of Vitriol and a possibility of a scarcity of the same have caused Eastern manufacturers to advance prices ½ cent per pound. The new quotations, as far as can be learned, are now being maintained, as follows:

<i>Paris Green.</i>	Per lb.
Less than 1 ton.	13c.
Arsenic kegs or casks.	13c.
Kegs, 100 to 175 pounds.	13½c.
Kits, 14, 28, 56 pounds.	14½c.
Paper boxes, 2 to 5 pounds.	14½c.
Paper boxes, 1 pound.	15c.
Paper boxes, ½ pound.	15½c.
Paper boxes, ¼ pound.	16½c.
One to 5 tons, 1 cent per pound less; 5 tons and over, 1½ cents per pound less.	

Paints and Colors.—**Leads.**—Under date of January 23 the National Lead Company advanced the price of White Lead, dry or in oil, Red Lead and Litharge. In lots of 500 pounds and over White Lead in Oil is quoted at 6¼ cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

Oils.—**Linseed Oil.**—For small lots, business is considered satisfactory for the season. Large buyers are not placing orders for future delivery, and crushers appear indifferent. The market remains firm in tone. Quotations, according to quantity, are being well maintained, as follows: City Raw, 46 to 47 cents; State and Western Raw, 45 to 46 cents per gallon.

Spirits Turpentine.—The high figures which Turpentine has reached result in buyers pursuing a hand to mouth policy, purchasing only for immediate requirements in this market. The Southern tone is bullish, owing to active export demand. Quotations at this point, according to quantity, are as follows: Southern, 63 to 63½ cents; machine made barrels, 63½ to 64 cents per gallon.

THE EDGE TOOL CONSOLIDATION.

THERE have been of late frequent conferences in regard to forming the merger of Edge Tool interests in accordance with the project which has been outlined. It was anticipated that the plans would have matured before this, but for one reason or another, mostly connected with the financing of the consolidation, the result is as yet undetermined. Some options have expired and negotiations for their renewal are in progress. There are rumors that the project is assuming somewhat narrower proportions than was intended when the outlines of the plan were laid before the public. There is considerable difference of opinion as to the probable success of the efforts to effect a merger of the interests involved. The repeated postponements of its consummation, in connection with what are regarded as the inherent difficulties of the project, are shaking the confidence of the trade in its success.

BIGELOW & DOWSE COMPANY'S FIRE.

THE large establishment of the Bigelow & Dowse Company, Boston, Mass., was entirely destroyed by fire on Tuesday night, 27th inst. The loss is estimated at \$250,000, fully insured. The company have not yet decided as to their future plans. They are temporarily located at 141 High street.

ANNOUNCEMENT is made that the line of Locomotive Cab Seats, &c., formerly made by Stannard & White Company, Appleton, Wis., will hereafter be manufactured by the Gold Medal Camp Furniture Mfg. Company, Racine Junction, Wis.

Hardware Organizations.

Most of the prominent associations of retail Hardware merchants will hold their annual meetings during the next few weeks. The following is a list of the associations whose conventions will take place during this period:

WISCONSIN, February 4 and 5, Milwaukee.
ILLINOIS, February 10 and 11, Bloomington.
MISSOURI, February 11 and 12, St. Louis.
IOWA, February 11, 12 and 13, Des Moines.
INDIANA, February 17, 18 and 19, Indianapolis.
NORTH DAKOTA, February 18 and 19, Fargo.
KENTUCKY, February 24 and 25, Louisville.
NEBRASKA, February 24 and 25, Lincoln.
OHIO, February 24, 25 and 26, Columbus.
MINNESOTA, February 26, 27 and 28, Minneapolis.
PENNSYLVANIA, March 3 and 4, Pittsburgh.
NEW YORK, March 11 and 12, New York.
NATIONAL ASSOCIATION, March 17, 18 and 19, Chicago.

The dates of the Kansas and New England meetings have not yet been determined.

Chicago Retail Hardware Association.

The Chicago Retail Hardware Association held their tenth annual reception and ball on Wednesday, January 21, at the Illinois Hall, Chicago. The reception was well attended, and a most enjoyable time was experienced. In addition to dancing the following entertainment was provided: Piano solo, E. W. Graham; violin solo, Geo. Fredricks; recitation, Frank H. Suter; vocal solo, E. J. Stover; cornet solo, Jas. C. Camp; recitation, Frank H. Suter; bass solo, Wm. Hanson.

To the following efficient committees was intrusted the management of the affair. Arrangements Committee: H. E. Gnadt, chairman; G. R. Lott, E. L. Somers, G. A. Neeb, Wm. J. Krueger. Reception Committee: D. McLaughlin, chairman; Geo. A. Engelhardt, Wm. T. Gormley, John Hora, H. C. Peppler, Carl Herzog, Otto Hagen, Fred. Kurtz, Chas. H. Menzel, H. J. Racey, Anton Pophal, J. L. Smith, F. F. Porter, H. E. Rebmman, L. Rosenberg, F. H. Schanze, Henry Stuckart, Fred. Waller, J. C. Wirths, W. H. Bennett, N. N. Nindborg, S. Melohn, L. Stauber, A. L. Adam, John Schuberth, E. H. Biersdorf, J. H. Bixler, J. F. Borchardt, B. F. Boysen, J. M. Ruedell, F. C. Schmidt and P. H. Shuster. Floor Committee: A. J. Engelhardt, chief; W. B. Costello, Hans Fehr, G. J. Bartholdy, Chas. A. Dalstrom, Leo Krueger, Martin Engelhart, Grant W. Porter, Fred. Ruhlmg and M. W. Powers.

Ohio Hardware Association.

D. R. Burr, Piqua, Ohio, corresponding secretary of the Ohio Hardware Association, issues the following circular pertaining to the coming convention. It is accompanied by an application blank to be filled out by those desiring to become members:

NOW IS THE TIME.

The ninth annual convention of the Ohio Hardware Association will be held in Columbus, Ohio, on February 24, 25 and 26, 1903, with headquarters at the Great Southern Hotel. If you are not a member of the association this is the time you should be. Fill out the inclosed application blank and with \$4 send to the undersigned. Make your arrangements now to attend this convention. We have every reason to believe it will be the best and largest ever attended.

If you are a member of the association give this blank to some dealer who is not and urge him to join; tell him what the association has done for you and what it can do for him. Our membership is increasing rapidly, but we still have room for more.

Be present to hear the report of the Insurance Committee on the organization of the Ohio Hardware Dealers' Fire Insurance Company. Their report to the Insurance Commissioner has interested him and he has congratulated our committee on the organization. If this report has been of interest to him it certainly ought to interest you. Do not put off your arrangements for attending, but make them at once. We need you.

All railroads will allow a reduced rate of fare for the round trip. Buy a regular one-fare ticket to Columbus and ask your ticket agent for a certificate showing purchase of your full one-way ticket; present this certificate to the financial secretary, W. C. Jones, who will be present at all times at the convention hall, and he will see that the certificate is countersigned, enabling you to return home for one-third of the regular one-way fare, making the round trip one and one-third fare. All hotels will give rates.

The annual banquet will be held on Wednesday evening,

February 25, good music and entertaining speakers being promised. Do not miss this opportunity to know your fellow Hardwaremen.

May I not have the pleasure of your application, if not a member of the association, by return mail? Respectfully,
D. R. BURR, corresponding secretary.

DON'T FORGET THE DATES.

New York State Association of Retail Hardware Dealers.

John R. Taylor, the energetic and efficient secretary of the New York State Association of Retail Hardware Dealers, with a view to developing the association and making its first annual meeting, to be held in the Astor House, New York City, March 11 and 12, an unqualified success, is thinking of using the form of invitation for nonmembers which is shown herewith. As will be inferred, blank invitations are sent to the members, who invite Hardware merchants of their acquaintance who

St. Louis Retail Stove and Hardware Dealers' Association.

A meeting of the St. Louis Retail Stove and Hardware Dealers' Association was held Wednesday, January 11, for election of officers and for the arrangement of plans and details in connection with the coming convention of the Missouri State Hardware Association, to be held in St. Louis, February 11-12. The following officers were elected: Wm. H. Hahn, president; G. A. Pauly, first vice-president; E. L. Wachter, second vice-president; Louis Boehl, secretary; J. W. Wertz, treasurer.

The committee to arrange details for entertainment of association consists of F. A. Steinmeyer, F. A. Kansteiner, R. N. Meyers, and officers ex-officio. An invitation has been extended to all retailers in the State of Missouri to attend the coming convention and a large gathering of merchants is expected. The committee

INVITATION TO ATTEND
1903 ANNUAL MEETING
N. Y. A. R. H. D. EXTENDED TO

BY

This stub is to be returned to JOHN R. TAYLOR, Secretary, Little Falls, N. Y.

NEW YORK STATE ASSOCIATION OF RETAIL HARDWARE DEALERS

H. D. HULL, President
Troy, N. Y.

JOHN R. TAYLOR, Secretary
Little Falls, N. Y.

To M

The Officers of this Association extend to you a cordial invitation to attend the FIRST ANNUAL MEETING which will be held March 10 and 11, 1903, at the Astor House, New York.

(Signed) ..

Member N. Y. A. R. H. D.

are not already members. It is scarcely necessary to say anything in explanation of the form, which speaks for itself and suggests the manner of its use. It would seem to be a method well adapted to its purpose and worthy of trial by other associations whose annual conventions are soon to take place. It has the obvious advantage of giving the secretary a selected list of houses whose identification with the association may be sought.

Iowa Retail Hardware Dealers' Association.

The Iowa Retail Hardware Dealers' Association have prepared an interesting programme for their annual meeting, to be held at Des Moines, headquarters Kirkwood Hotel, on February 11, 12 and 13. A number of papers on live Hardware topics will be read, among them "The Tendency of the Times as Relates to the Retail Hardware Dealers," by C. S. Barger of Albia; "Energy in Business," by Clarence Phillips of West Liberty, and "The Three Essentials—the Manufacturer, the Jobber, the Retailer," by Chas. Swaine of Council Bluffs. At the morning session on Friday, 13, M. L. Corey, secretary of the National Retail Hardware Dealers' Association, will address the gathering. There will also be a discussion on the subject, "Shall We Organize a Mutual Fire Insurance Department," introduced by S. R. Miles of Mason City. The Question Box will be a feature of several of the sessions.

Kentucky Retail Hardware and Stove Dealers' Association.

The third annual meeting of the Kentucky Retail Hardware and Stove Dealers' Association will be held at Liederkranz Hall, Louisville, February 24 and 25. An interesting and attractive programme is in course of preparation, and will be announced in a few days.

have about completed arrangements for a banquet to be given at the Mercantile Club on the evening of February 11.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

The Kennedy Hardware Company, Limited, will open up in the wholesale Shelf and Heavy Hardware business at 49 Colborne street, Toronto, Canada, about February 15. Samuel R. Kennedy is president and managing director of the concern, and James J. MacLennan vice-president. The company will be pleased to receive catalogues and other matter from American manufacturers.

The Harris Hardware Company have purchased the business of the Manchester Hardware Company, at 3202 Park avenue, St. Louis, Mo., and will continue the store with T. C. Harris as manager. They would like to receive catalogues relating to Hardware, Stoves, &c.

J. W. Hambrick has succeeded the Western Co-operative Association in the Hardware business at 41 Osage avenue, Kansas City, Kan. Mr. Hambrick requests catalogues relating to the General Hardware line.

The Adams Hardware Company will open a new business at 2003 Main street, Niagara Falls, N. Y., on or about February 14. They will handle General Hardware, Stoves and Ranges and House Furnishing Goods, and will also deal in Paints, Oils, &c. They would be

pleased to receive catalogues and price-lists relative to the above lines.

Kloke Hardware Company, Pierce, Neb., have lately entered business at that point. They request copies of catalogues relating to General Hardware, Stoves, Tinware, &c.

SYNDICATE BUYING.

THE interesting and able letters we have published in regard to syndicate buying are characterized by one remarkable feature, as they are almost unanimous in condemning the system, either unconditionally, which comparatively few of them have done, or on account of what are considered abuses connected with it. Letters in this spirit have come from manufacturers and merchants, two great classes whose support of syndicate buying in one way or another is essential to its existence. One would suppose with this opposition from those who produce the goods and from those who purchase them that the system would have disappeared long ago. This, however, is evidently far from being the case, as is shown by the fact that a large majority of the recognized jobbing houses employ the system, and that many of the manufacturers, notwithstanding the annoyances connected with it, have been and are glad even in busy times to do business with those thus represented. The reluctance of both jobbers and manufacturers to speak a good word for the system is thus noticeable, and meanwhile it is whispered in the trade that they are still continuing their relations with the syndicates, some, indeed, showing a disposition to make even increased use of them. Under these circumstances the following letters which come to us from jobbers and manufacturers who are understood to be identified with the system are of interest:

A Legitimate Business.

From a Southern Jobbing House: Regarding the much discussed matter of syndicate buying we have but little to say. We believe that the syndicate buyer occupies a legitimate position in the trade, and if the business was properly conducted there would be no objection raised. We think if a half dozen or more large representative jobbers choose to employ a representative to look after their purchases and keep them posted as to changes, that no legitimate complaint could be brought against them.

The syndicate buying business has been brought into bad repute by individuals who undertake to represent small jobbers and large retailers and endeavor to secure the same prices, terms, &c., for this class of trade that the larger and more reputable jobbers enjoy. We believe that if syndicate buyers would represent only large jobbers, who are entitled to the best prices and terms, there would be no opposition lodged against the business either by manufacturer or jobber.

A Manufacturer's Satisfactory Experience.

In reference to the syndicate buying question, will state that there is no doubt but that some manufacturers who cater to the trade of the syndicate buyers would rather take their chances on getting the business from the jobbers direct at higher prices. We believe, however, that the syndicate buyers have come to stay, and as we have considered the question seriously, we feel quite confident that the business is growing and that while some manufacturers may find it against their interests to deal with the syndicate buyers, there are no doubt others, including ourselves, who use the syndicate buying system to an advantage. We sell largely through at least two of the syndicate buying firms, who have sent us orders for a number of the largest and most reputable jobbers throughout the country, although at times we have received from the same buyers orders

from the smaller class of houses. A fellow manufacturer argued with us that the syndicate buyers could not make any trade for us and that they bought on price only. We put the matter to a test by calling upon one of the syndicate buying firms and explaining the merits of our highest priced goods in comparison with other makes of the same class, and we must confess that the syndicate buyers gave us a surprise with the volume of business they worked up for us on this high priced article, and which business we know was taken from our competitors, and notwithstanding the fact that other manufacturers as well as ourselves make the same class of goods in several cheaper grades. We are not much in sympathy with this talk against the syndicate buying system, as we believe it is insincere in the majority of cases.

Who Is a Jobber?

From a Wholesale House: We hardly know how to discuss the question of syndicate buying, because every one has a perfect right to employ any certain person to work for him, and certainly any individual or any set of men who may be located in New York have a right to make a contract with all classes or kinds of people throughout the country to do work for them for a certain consideration. Therefore to say that the syndicate buyer is something that should not exist would be to set one's self up as a dictator as to what individuals should be allowed to do.

We do think, however, that the manufacturers should be very careful as to how they place special prices with a syndicate buyer who has a very large list of small houses as his clients; and a buyer who would take on his list of clientage only those who do from \$500,000 to \$1,000,000 or more would not tread on the toes of any one, and he would be able to buy goods, or should be able to buy goods in very large quantities, thereby entitling him and all of his customers to lower prices than should be made to small houses whose principal business is retail.

No one has as yet successfully solved the question of "Who is a jobber?" Most of the syndicate buyers have such a large list of small houses as their customers that the larger houses have been forced to place most of their orders direct with factories who do not care to name prices to syndicate buyers, which prices would many times be satisfactory to us, but which the manufacturer does not wish to get to the smaller buyers.

UNION FURNACE MFG. CO., INCORPORATED

THE UNION FURNACE MFG. COMPANY, Incorporated, Altoona, Pa., manufacturers of Shovels, Spades and Scoops and Pressed Steel Specialties, are rebuilding and enlarging their works which were destroyed by fire last September. The capacity of the new plant will be more than double that of the old one, and when it is completed this concern will be in shape to manufacture from 150 to 200 dozens of Shovels per day. The Union Furnace Mfg. Company, Incorporated, last week elected officers as follows: J. King McLanahan, Jr., president; H. Hemmelwright, secretary, and directors as follows: James Virdin, W. C. Moore, A. C. Quandt, A. W. Cherry and J. S. Sillyman.

TRADE ITEMS.

D. T. HARRIS, who formerly represented the Simmons Hardware Company of St. Louis in Pittsburgh, Pa., has taken an interest in the Norwell-Shapleigh Hardware Company of St. Louis, and will look after their trade in New York and Pennsylvania, with headquarters at 42 Shiloh street, Pittsburgh.

A FIRE OCCURRED in the Franklin Building, 9-15 Murray street, occupied largely by Hardware people, Sunday morning, January 25. It started on the seventh floor of No. 15 in the work room of Frank F. Lisiecki, printer and stationer, also damaging the floor overhead. On the same floor adjoining, or No. 13, were the office and sample rooms of the International Enamel Ware Company, Stransky & Co., proprietors, who were damaged only by

smoke and water. Underneath on the third floor, occupying the entire width of the building, are Wiebusch & Hilger, whose damage, like that of the Yale & Towne Mfg. Company, P. & F. Corbin and Corbin Cabinet Lock Company, below them, was entirely by water and apparently slight, the building being a modern one of slow burning construction.

HENRY S. BLOSSOM'S DEATH.

AT a meeting of the wholesale Hardware jobbers of Cleveland, held on the 19th inst., the following resolutions were unanimously adopted relative to the death of Henry S. Blossom, to which reference was made in our last issue. The resolutions are signed by the Geo. Worthington Company, Lockwood-Taylor Hardware Company, McIntosh, Huntington Company and H. W. Luetkemeyer & Sons:

Whereas, With deepest regret we have learned of the death of our esteemed friend and associate, Henry S. Blossom, secretary of the W. Bingham Company;

Therefore, be it resolved, That we, his associates in the Hardware jobbing business in Cleveland, take this means of publicly expressing our recognition and appreciation of the many sterling qualities of character and mind displayed by him during life; his devotion to his family and to his interests in the business world; his public spirit and his uniform courtesy and good will.

Be it resolved, That in this, their hour of affliction, we extend to his family, friends and associates our condolence and heartfelt sympathy.

Be it resolved, That a copy of these resolutions be furnished the public press and transmitted to his family and to his business associates.

CARRIAGE, WAGON AND ACCESSORY TRADES DIRECTORY.

"THE American Carriage and Wagon and Accessory Trades Directory," which also includes manufacturers and dealers in Automobiles, is the name of a comprehensive volume of 712 pages bound in stiff blue covers and published by the Price & Lee Company, New Haven, Conn. The current directory, just issued, is the fifteenth edition, being revised and issued annually. The book is divided into sections or departments, each equally available by means of projecting cloth tabs for ready reference. The first section relates to Carriage and Wagon makers and repairers, the next to Carriage and Wagon manufacturers, then Carriage and Wagon dealers, Sleigh manufacturers, accessory trades, and last of all, Automobile manufacturers and dealers. Each section is arranged by States, subdivided into the various cities and towns in alphabetical order, giving also the population of cities, &c., according to the last census, this order being followed in each section.

JAS. H. BAKER MFG. COMPANY.

THE JAS. H. BAKER MFG. COMPANY, with offices in the Park Building, Pittsburgh, and works at Tarentum, Pa., manufacturers of Wagon Hardware, Drop Forgings, Duplicate Bending, Special Forgings, &c., have now in operation at their plant a machine for making End Clips, which is patented by Jas. H. Baker, vice-president and general manager of the concern. This machine will forge 2000 Clips per hour of the ordinary sizes. It will also forge the Ribs on the edge of the Clip next to the round part, a feature very desirable, but which up to this time had not been commercially attainable. It will be remembered that about 20 years ago Mr. Baker brought out the Singletree Clip, known as the Baker Clip, which was an improvement over those made at that time. This method of making, however, has been discarded for the present one. The Jas. H. Baker Mfg. Company are now building a very large and complete machine for automatically making the Center Clips for Singletrees and other work, and they expect to have it in operation at an early date. While it is a common practice to make Wire Nails, Wire Hooks, &c., by automatic machinery working very rapidly from cold stock, it is quite a novel operation to see hot forgings made so rapidly.

CONTENTS.

	PAGE.
The Cornell Twenty-four Foot Boring Mill. Illustrated.....	1
Niagara River Power Questions.....	2
An Independent Fire Brick Consolidation.....	2
Gas Fuels for Modern Engines.....	4
Unusual Activity in Wheat.....	5
The Damascus Steel Company.....	5
The British Metal Trades in 1902.....	6
The Lunkenheimer Mechanical Oil Cup. Illustrated.....	8
Labor Leaders Favor the Senate Eight-Hour Bill.....	9
The Jones & Laughlin Railroad.....	9
Manganese Ore as a Desulphurizing Agent in Basic Open Hearth Practice.....	10
Great Advantages Claimed for Buffalo.....	11
The Production of Pig Iron in 1902. Illustrated.....	12
The Tabor Molding Machine in Great Britain.....	13
Lake Iron Ore Matters.....	14
The Mohawk Valley Steel & Wire Company.....	15
Five-Ton Steam Wagon for West Africa. Illustrated.....	16
The Drawback on Crucible Steel and Farriers' Tools.....	18
Crushed Steel and Steel Emery.....	18
The Jas. D. Swindell Bell Coal Hopper for Gas Producers. Illustrated.....	20
The American Card Clothing Company.....	21
Metric Weights and Measures in Germany.....	22
"Concerning Iron Making".....	23
The Westcott Spur Geared Scroll Lathe Chuck. Illustrated.....	23
Passage of the Ray Bankruptcy Bill.....	24
Tariff Agitation in Congress.....	25
Editorial:	
The Iron Age Index.....	26
The Coal Famine and the Illinois Anti-Trust Law.....	26
Benner's Prophecies.....	27
The Anthracite Industry.....	27
The British Iron Trade.....	29
The Colorado Fuel & Iron Company.....	30
Buffalo Forge Company's Salesmen's Meeting.....	31
Pacific Coast News.....	31
The Parsons Turbo Blowing Engine.....	31
Obituary.....	32
Manufacturing:	
Iron and Steel.....	33
General Machinery.....	33
Power Plant Equipment.....	35
Foundries.....	35
Fires.....	36
Hardware.....	36
Miscellaneous.....	36
The Woodward & Powell Planers.....	37
Personal.....	37
The Iron and Metal Trades:	
Comparison of Prices.....	38
Chicago.....	38
Philadelphia.....	40
Cincinnati.....	41
Birmingham.....	41
Cleveland.....	42
St. Louis.....	42
Pittsburgh.....	43
The French Iron Market.....	44
Cincinnati Machinery Market.....	46
New York.....	46
Metal Market.....	47
Iron and Industrial Stocks.....	47
An Injunction Against the Bridge Workers' Union.....	47
Cleveland Machinery Market.....	48
The New York Machinery Market.....	49
The Fritz Medal.....	49
Trade Publications.....	50
Notes from Mexico.....	51
Late Chicago News.....	51
The Keystone Driller Company.....	51
Hardware:	
Condition of Trade.....	52
Notes on Prices.....	53
The Edge Tool Consolidation.....	55
Hardware Organizations:	
Chicago Retail Hardware Association.....	55
Ohio Hardware Association.....	55
New York State Association of Retail Hardware Deal- ers. Illustrated.....	56
Iowa Retail Hardware Dealers' Association.....	56
Kentucky Retail Hardware and Stove Dealers' Asso- ciation.....	56
St. Louis Retail Stove and Hardware Dealers' Asso- ciation.....	56
Requests for Catalogues, &c.....	56
Syndicate Buying.....	57
Union Furnace Mfg. Company Incorporated.....	57
Trade Items.....	57
Henry S. Blossom's Death.....	58
Carriage, Wagon and Accessory Trades Directory.....	58
Jas. H. Baker Mfg. Company.....	58
Death of Florian Grosjean. Portrait.....	59
Washington Cutlery Company.....	59
The Traveling Salesman: His Methods and Control.....	60
English Commercial Travelers.....	60
Death of Hezekiah Scovill. Portrait.....	62
British Letter.....	63
Paints in the Hardware Store. Illustrated.....	65
The Richardson-Oliver Company.....	66
Among the Hardware Trade.....	66
The Edwards Nested Stove Pipe. Illustrated.....	67
The United States Family Scale. Illustrated.....	67
The Whirligig Ice Cream Truck. Illustrated.....	67
The Creamy Ice Breaker No. 49. Illustrated.....	68
The Fountain Lawn Sprinkler. Illustrated.....	68
The New Chicago Ice Cream Freezer. Illustrated.....	68
The Clauss Baby Tailor Shears No. 3B. Illustrated.....	68
Wenzel's Toy Cannon. Illustrated.....	69
Palmer's Patented Repose Hammock. Illustrated.....	69
Rural Mail Delivery Boxes. Illustrated.....	69
The Turner Cluster Arc Gas Light. Illustrated.....	70
The Waggoner Watchman's Clock. Illustrated.....	70
Current Hardware Prices.....	71
Current Metal Prices.....	78

DEATH OF FLORIAN GROSJEAN.

FLORIAN GROSJEAN, president of the Lalance & Grosjean Mfg. Company, died at his home, 314 Schermerhorn street, Brooklyn, Saturday evening, January 24, of double pneumonia, after an acute illness of 36 hours, although he had been more or less an invalid for four years, the impairment of his physical and mental forces necessitating the most constant attention on the part of both family and physician.

Florian Grosjean was born in Saule, Switzerland, January 12, 1824, beginning his business career as a clerk in the employ of one Lalance, a banker, in Montbelliard, France, who, when young Grosjean had arranged to go to America, said: "If you will take my son in partnership I will furnish the necessary capital." The son came to the United States as planned, with Mr. Grosjean but died here six months after his arrival. A brother of the deceased, Charles Lalance, came over subsequently to arrange for the removal of his brother's body to France. He also determined to retain his brother's financial interest in the firm. In 1869, on the reor-



FLORIAN GROSJEAN.

ganization of the business, Mr. Grosjean bought out the Lalance interest, although Charles Lalance was identified with the company until his death in 1901 as a stockholder, not, however, participating actively in the conduct of the business. He visited this country but twice in his life, the second journey being on the occasion of the death of Mr. Grosjean's son, Alfred, aged 30, who was drowned in Lake Weir, Fla., in 1888. Mr. Lalance became a prominent citizen of France, wearing the cross of the Legion of Honor for meritorious services during the Franco-Prussian War.

From this it will be seen that to Mr. Grosjean belongs the sole credit of founding and developing the immense business which is a monument to his name. Originally, the house, which was established in 1850, imported Kitchen Utensils of all kinds, both of tin and enameled ware, the latter blue and white, manufactured by the well-known concern of Japy Freres, Montbelliard, France, together with some of Belgian make. Their New York office was first located in Hanover square, then successively at 70 Beekman street, 273 Pearl street, 89 Beekman street, thence to 19 Cliff street, where, as now, they have been for over 20 years. From importing and jobbing foreign merchandise the house began to manufacture first Sheet Metal Spoons in Hester street, New York. As the business grew larger quarters were needed, and the plant was removed to Woodhaven in 1863, then in the outskirts of Brooklyn, now well within the lim-

its of Greater New York, where from 75 to 100 workpeople were employed. As an indication of how the business has expanded it may be said the works require a site of over 20 acres and over 2000 people are on the pay rolls, many of whom own their own homes. At this factory are manufactured complete lines of Tin, Japanned and Enameled Kitchen and House Furnishing Utensils, among which are Blue and White, all White, Regal, Pearl-Agate, El-an-Ge and Agate Nickel-Steel Enameled Wares.

The first Enameled Ware, blue and white, made in this country was produced at this plant in 1865, Mr. Grosjean bringing over a Belgian enameeler, skilled in the trade, to properly organize the new department. Agate Enameled Ware, now known as Agate Nickel Steel Ware, was first made by them in 1876.

Mr. Grosjean was eminently practical, quick to observe the requirements of trade and to adopt every improvement in the various processes of manufacture; a man of untiring energy, resolute will and exceptional executive and financial capacity. He also had rare judgment in surrounding himself with lieutenants of ability and integrity. His mind was thoroughly concentrated in his business, giving the company's affairs his undivided personal attention. He has, from being the pioneer in this country in both Stamped Sheet Metal and Enameled Wares, witnessed the business grow until now the goods are extensively sold at home and exported to many foreign countries. He also held strongly to individuality in business, persisting in conducting his own as best suited him, although often the recipient of many attractive offers to consolidate.

In 1876 a disastrous fire completely destroyed the Woodhaven plant, but in a few months new buildings were erected and the business continued on the same site. Mr. Grosjean's standing with his employees is indicated by the fact that there has never been a strike at this factory, one reason for which perhaps is the fair and liberal treatment of the help and the participation of many of the workmen as stockholders in the business. Personally, Mr. Grosjean was a fine, courtly gentleman of the old school, generous and hospitable, sparing neither effort or money in entertaining friends until of late, owing to impaired health and failing faculties, he has required constant care.

About ten years ago the company established a rolling mill at Harrisburg, Pa., on a site of 12 acres, which has recently been increased to 20 acres, where they roll their own steel sheets and make the tin plate required. Both plants were closed down until after the funeral, and a delegation of 12 were chosen to represent the workmen at the funeral services.

WASHINGTON CUTLERY COMPANY.

ON January 19 Washington Cutlery Company, Milwaukee, Wis., gave a reception to Milwaukee and other Wisconsin Hardwaremen in honor of the opening of their new and commodious quarters for jobbing in connection with the new and complete factory which they have built for the manufacture of their Village Blacksmith brand of Butcher, Bread, Putty and Kitchen Knives. The plant has been fully equipped with the latest and most improved machinery, and is lighted by their own electric plant. Employment is given to 40 men. The company have been jobbers of Cutlery for nine years past, and have now embarked in the manufacture of this line.

S. D. Wade has bought a controlling interest in the Clarksville Hardware Company, Clarksville, Tenn., and J. M. Bowling has retired from the business. Mr. Wade succeeds Mr. Bowling as president of the company. J. H. Turnley succeeds Geo. S. Bowling, who also retires, as a member of the Board of Directors. The following are the new officers elected: S. D. Wade, president; W. M. Atkins, vice-president; James T. Rudolph, secretary and treasurer.

J. E. McGuire has purchased the Hardware, Stove, Farm Implement and Sporting Goods business of F. L. Belzer, Rock Rapids, Iowa.

THE TRAVELING SALESMAN HIS METHODS AND CONTROL

BY SAMUEL MASTERS.

CHAPTER IV.—The Management of Salesmen.

THE details of the management of salesmen necessarily vary with varying conditions. In the ordinary manufacturing establishment with but two or three men in the office, and one or two on the road, it is the manager of the business who governs the salesmen just as he does other employees. In the largest manufacturing concerns and in the jobbing houses there is too much of detail to make it possible for one man to handle it all, and the sales manager naturally takes charge of the salesmen. Sometimes he hires them and dismisses them, but more often there is some one with greater authority than he possesses who engages the men, fixes their salaries and turns them over to the sales manager for instructions. Usually this method works satisfactorily, but sometimes it is just the reverse, and leads to ill feeling which affects the salesmen's work. Instances can be cited in which the sales manager, thirsting for greater authority, has deliberately handicapped salesmen in order to prove that the man who employed them was lacking in judgment.

THE SUCCESSFUL MANAGER.

The man who would successfully manage a force of salesmen must be possessed of tact, courtesy and an ability to command respect, and he must pursue a consistent policy along definite lines so that his men may know what to expect in any contingency. He must be scrupulously honest and straightforward in his dealings with them and avoid any semblance of trickery, for his men are usually at a long distance from him, and it is very easy to destroy by a false move or a poorly worded letter the confidence which alone makes cordial relations possible.

HARMONY ESSENTIAL.

And the relations must be cordial to gain the best results. The men must feel that the house is treating them fairly at all points, that their prices are right, that orders will be filled as taken, that the instructions they receive are to be depended upon to the very letter, and that their work will not be judged in a captious, fault finding spirit. In short, to achieve the best results the salesmen must be filled with a spirit of loyalty to the house, and must receive treatment which will call forth their earnest support and hearty efforts for its best interests. A mean man, a warm minded man, or one who seeks to emphasize his own importance by belittling his men on the road, can never hope to succeed as a manager of salesmen.

SYSTEM VS. RED TAPE.

One of the most common errors on the part of a manager of salesmen is to curb them too tightly and hamper them with a lot of nonessential rules intended to prevent mythical or extremely rare violations of the usual order of things or to save trouble in the house. Given such a manager, and one salesman who is unruly and wont to overstep his instructions and provide cause for the formation of new regulations and restrictions, and a force of salesmen can be easily nagged into a state of discomfort and distrust that well nigh destroys their effectiveness.

Equally injurious is the manager who cannot distinguish between valuable system and useless red tape. There is many a conscientious, hard working manager of salesmen who feels that he ought to control or at least know of every occurrence or condition that may affect the sales, who burdens his men with a lot of useless work in the way of reports. He would know the goods that were offered and the prices, why sales were not made, whose goods the merchant is handling, when he will next be in the market—all information of value to the salesman, and which he gains for his use later, but which burdens the manager's records needlessly and by its prolixity forms a mass of detail which cannot be conveniently handled.

THE PROMOTED SALESMAN.

It is usually the case that the sales manager is a man who has at some time been upon the road. Often it is his ability to make sales as there displayed that has led to his being given charge of the entire department and the management of the men among whom he formerly worked. He naturally feels that he can enter understandingly into the experiences of the salesmen, and is competent to advise and instruct them not only as to the goods and their prices, but the best methods of presenting them and of meeting objections raised by customers. If his confidence in his own methods is unbounded he is apt to try to make his men all conform to his pattern; if he believes that the salesmen should be given all possible freedom he may go too far to the other extreme and fail to keep in proper touch with them. It is not enough that a man has been an unusually good salesman to warrant his choice as manager of a traveling force. He must be a man of excellent business judgment and possessed of a goodly amount of administrative ability.

A DIVISION OF AUTHORITY.

In the very largest jobbing houses—probably not more than a dozen in the entire Hardware field—the management of salesmen has been reduced to a science. On matters relating to his territory the salesman has to deal with a routing clerk, and on credits and collections with the credit man. The manager of the sales department gives him prices and terms and handles his orders, and the auditing department figures the profits on his sales and thus fixes his remuneration. He is told when he may sell, and to what amount, and is advised by the bookkeepers of the condition of accounts, and at every step he is kept informed of everything that may possibly affect his relations with the customers in his territory. If he loses in independence he gains in knowledge, and is able to render the best service possible.

ABSOLUTE KNOWLEDGE NECESSARY.

Nothing is more necessary in the successful management of salesmen than positive knowledge of a few essential facts. Ignorance of these facts is fatal, and no less fatal is it to be unable to distinguish between necessary facts and useless detail. In the chapters that follow an effort will be made to give some definite information and pertinent suggestions based upon their writer's personal experience, and the subject is first treated from the jobber's standpoint because of the greater detail in which the work is carried on in the jobber's establishment, and consequently the more perfect demonstration that can be thus made.

ENGLISH COMMERCIAL TRAVELERS.

A Letter from an Englishman.

To the Editor: The interesting series of articles you are beginning in regard to the American commercial traveler suggests to me that perhaps something about the English type may be in order. The difference in methods and spirit is certainly striking.

The average commercial traveler in the mother country is an antiquated drone of futility compared with his American rival, and to him can be attributed no small share of Britain's loss of commercial prestige.

If British manufacturers and wholesale dealers were to infuse a little of the American hustling and matter of fact element into their representatives, knock the vanity out of them, pay them better and exercise greater vigilance over their work and conduct, they would then get better value and results out of their employees.

When a British commercial traveler succeeds in securing an appointment "on the road" he considers that he has been installed into a luxurious sinecure and assumes and exhibits an air of importance and independence toward every one—except customers, of course—that is odious, and with many of his customers he practices a considerable amount of hypocrisy, which he thinks is diplomacy, misleads his employer to an incredible extent and treats the general public with the loftiness of an autocrat, and the fault is not altogether with the man, for his misconduct is passively connived at, or at least countenanced by his employer, encour-

aged by customers and hotel keepers and perforce tolerated by the public at large. There are, it is true, exceptions to this, as to every other rule, but the exceptions in this particular phase of commercial life in England are rare and are limited mainly to Americanized establishments and the first-class progressive London houses. But the average commercial traveler predominates and is to be found generally in three different classes.

THE METROPOLITAN "COMMERCIAL."

In London and in fact in other large cities like Liverpool, Manchester, Birmingham, Leeds and Glasgow, the commercial traveler is usually localized and has assigned to him a routine plan to work. He is provided with a private carriage, and in company with a load of samples, makes a daily detour, calling upon regular customers in the order directed by his employer. His first care is his personal appearance, and he adorns himself in a silk hat and frock coat of the latest fashion and best material. He is often better clad than his superiors. His second consideration is personal comfort, and this he insures at all cost. He will not be overworked. Whatever orders are given to him at the outset, he pleases himself pretty much as to what he does, and has a stock of excuses for what he does not do. He feeds well at stated hours, takes light refreshment when he thinks proper and ends his daily task well before sunset. His idea of duty is of a methodical and conservative nature—simply to keep up the regular trade with regular customers. By no chance does he ever think of increasing business by adding a list of new customers. This would mean "touting," an undignified practice not indulged in by the would-be first-class English commercial traveler. Irresponsibility and the absence of an incentive create in him a deplorable spirit of independence and indolence; if he encounters any difficulty or inconvenience in seeing a customer he is off to the next place, and when he succeeds in meeting one he generally spends half an hour or probably an hour in doing what might be transacted in ten minutes. But the Londoner, with all his faults, compares favorably with

THE PROVINCIAL MAN ON THE ROAD.

This commercial magnate, whose official headquarters are at one of the large cities, is given a certain district to work, varying in size and distance according to the particular class of trade he represents.

He generally lives at a convenient spot to enable him to make short weekly tours and get back home on Friday or Saturday for the week end. On Monday morning about 10 o'clock he starts from home to work his circuit—sometimes a large town—a distance of from 20 to 50 miles—or a series of smaller towns. He generally takes with him an abundance of samples, either for display at his hotel or for hawking round for the inspection of his customers. When the samples are "on show" the regular customers are duly advised and are invited to view them. The remainder of the Monday is taken up in traveling and leisurely unpacking the goods. At the end of the day, about 5 o'clock, the traveler prepares to join his *confrères* in a special room allotted to them alone by the proprietor. Any one but a member of the fraternity desiring to enter this sacred "commercial room" is regarded as an intruder, and it is only by special permission and under exceptional circumstances that a stranger is allowed within the threshold. To sit at table and partake of a meal with these commercial dignitaries (at one's own expense even) is the highest privilege those men can bestow upon an outsider. The repast is a sumptuous one, presided over by a president and vice-president (generally the senior travelers), who have the power to regulate and govern the company present. When the meal is over permission to disperse is given by "Mr. President," and then a few proceed to attend to their correspondence, some to play cards, others make their way to the billiard room or place of amusement or to visit friends, while the arch-hypocrites occasionally put in an appearance at a prayer or other such meeting at a place of worship patronized by their best or most friendly customers. It must be very urgent business indeed to occupy any time after dinner,

and it must in any event be of a quasi personal character to usurp a moment of the evening's enjoyment.

Later in the evening the fraternity congregate in their room and settle themselves down to drink, smoke and tell stories in turn. In not a few instances story telling is an important adjunct to a commercial traveler's stock in trade, and a very varied and questionable stock it is. To his fellow travelers he retails them indiscriminately, in relating them to his customers he exercises greater care and only tells them what he considers politic. In this respect he proves himself to be a fair judge of human nature and not lacking in memory.

Next morning he rises between 8 and 9 o'clock and enjoys a hearty breakfast with ease and comfort. He then reads the news of the day, and about 10 or 11 o'clock begins to think of business. This reminds him that he must have a "pick-me-up," and he has it. Then probably a customer arrives to inspect samples, and should this gentleman not be a teetotaler—which often is the case—the traveler invites him to join in a drink—"the first to-day." While liquidating their beverage they chat freely about general and local politics, religion, social, domestic and municipal affairs, and confidentially discuss the financial position of their trades people in the town. By the time this preliminary gossip is exhausted it is almost time for dinner, and the customer is generally asked to "tumble in, just to have a snack." Over this ceremony, the smoking of a cigar and "just one nip more," they invariably waste the best part of an hour. Then they slowly and in a roundabout way introduce business, which sometimes ends in a dialogue of this fashion:

"Well, no; I don't think I can do with any this journey, Mr. ——. Thank you. You see I have a good stock in yet."

"But, my dear friend, I shall not be around here again for another three months, and these are the very latest in the market—quite the newest. You had better let me send you, say—"

"No, really, Mr. —, thank you. Not this journey. To tell you the truth, what with a lot of outstanding accounts and many calls I am rather short of spare cash just now."

"Oh, but that will be all right. You needn't bother on that score. Any time will do, when you can spare it. I will send you—"

"No, please don't. I'll tell you what I will do, I will write you an order in a month or so and then—"

"But you may as well give me the order now, my dear boy. You see I shall not be at the office, and I shall lose my commission if your order goes there direct."

"Where will you be, then, in about a month from now?"

"My dear friend, goodness knows. I haven't the faintest notion. You see my movements are so uncertain. Look here, I will book your order now for—"

"I'd rather you didn't; no, please, don't. Can't you send me a post card in about a month or so and let me know where you are and I will then write?"

"But, my dear fellow, pardon me. What difference does it make whether you give the order now or in a month or two hence. Besides, don't you see I am a very busy man, and I am sure you will realize what a lot of trouble it would give me to have to write cards like that to all my customers. No, my dear Mr. —, it will save us both time and trouble if I book your order now. I assure you 't will be all right" (and he proceeds to inscribe the order in his book).

"Well, if you would rather—but would you mind making it three months, and then I shall be better able—"

"What does a month's difference make?"

"Quite so; thank you very much."

"To you, I mean. You see I should like to send all this journey's orders in before end of the quarter; besides it will probably be three months before you get the goods."

"Very well, but be sure to tell them not to send more than the order, as they did the last time."

"Yes, I remember that. It was a stupid mistake at

the office. I will make a note of it. Come and have another drink?"

"Well, just one, and I must go."

And off they go, and spend another half hour in asking each other about their wives, families, relations and friends. Anything and any subject to kill time and continue apparent friendly relations.

The day's business would very likely end in the traveler sending a larger order than that given, and notwithstanding his assurance to the contrary, in directing the goods to be delivered in the usual course, and perhaps in the account after all turning out a bad debt.

If by chance it should happen to be 5 o'clock, the appearance of another customer would not be welcomed by the commercial traveler, as he usually devotes this last hour before his evening meal to communicating with his firm.

Another and a more common type of the English commercial man to be met with almost in every hole and corner of the country is

THE RURAL TRAVELER.

He is of a second, third or fourth class grade, according to the trade or house he represents, and is engaged in canvassing small stores in the rural districts. He makes his headquarters at a central and convenient market town and goes his rounds by "posting," that is, by hiring a horse and trap from day to day until his district is completed. He is usually to be found with his own class at a second rate commercial or family hotel, where he claims and receives first and foremost attention. Woe betide the proprietor who dare show anything but the highest respect, preference and consideration for the commercial fraternity. A default in this respect would result in a dangerous system of boycotting. The railway companies, too, where there are no competitive lines, are subject to the same terror at the will of these artificial dictators, and are perforce obliged to exhibit more tolerance and politeness even to "the man on the road" than to a member of the ordinary traveling public. Assured that his dignity is in no way impaired and that his headquarters are the embodiment of comfort, the rural commercial traveler prepares to make his plan for the week. He first inquires of his host whether a rival has lately visited the neighborhood. The proprietor even for a present monetary gain dare not lie, for he well knows that its discovery is certain and would entail a serious future loss to him. His guest then troubles him with a few questions concerning the financial condition of some doubtful customers, and finally he settles down to map out his route. Monday, of course, is *dies non*, for it takes all his day to travel, unpack and make a general survey and a preliminary inquisition. On Tuesday he starts, usually about 10 o'clock in the morning, on a circuit of about 20 miles, calling on the way upon about half a dozen small trades people or store keepers and reaching home finally about 5 o'clock in the evening. Almost without exception he wastes three-quarters of his time in gossiping and talking about everything else but business. He dare not call upon a rival store keeper in the same village for more reasons than one, and as he goes from village to village he adapts himself with alertness and audacity in fully sympathizing with the different individual religious and political sentiments of his respective customers and in delivering words of comfort lavishly where there is the slightest excuse. He is too ready to take orders and to force customers to give unnecessary orders, and often he is guilty of sending more than is ordered. He not infrequently withholds from his employers necessary and in fact important information concerning the financial status of some of his customers, and in consequence of sometimes becoming a personal borrower is incapacitated from acting honestly between his principal and customers. There is really no occasion for the indulgence in this reprehensible practice, for in the great majority of cases the traveler is allowed liberal travelling, hotel and individual expenses, is paid a nominal salary and a small commission besides on orders and sometimes on cash received.

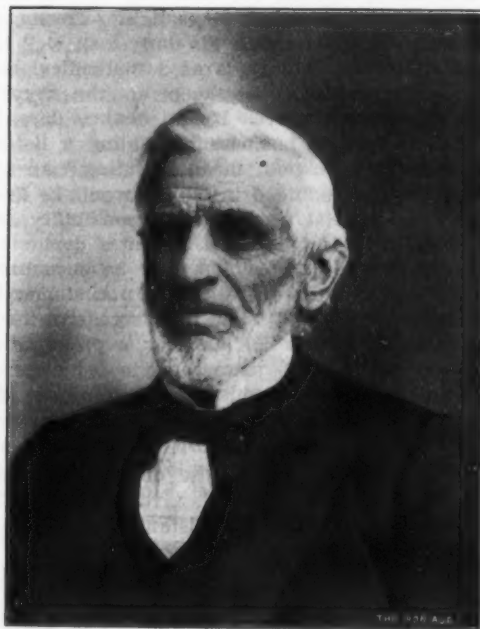
Altogether, the commercial traveling system in Eng-

land needs a drastic reform. The present day representative is too old and fossilized and self opinionated. Employers must engage younger men, and as in America, place them in a sufficiently responsible position to be fearless and honest and regardless of the personal fads and sentiments of their customers. They should also pay them enough to encourage the introduction of new business, as well as retain desirable customers and keep a watchful eye on the insolvent and undesirable ones.

DEATH OF HEZEKIAH SCOVIL.

HEZEKIAH SCOVIL, of D. & H. Scovil, Higganum, Conn., died Wednesday, January 14, aged 83 years, at his home in Higganum.

Hezekiah Scovil was descended from William Scovil, who, with others, about 1668 settled in that portion of Connecticut now known as Haddam, he obtaining land patents in 1686 from the Assembly. William Scovil left a son of the same name, from whom was descended Hezekiah Scovil, who was the father of two sons, named Daniel and Hezekiah, who established the business of making Hoes in 1844, under the title of D. & H. Scovil.



HEZEKIAH SCOVIL.

Hezekiah Scovil, Sr., had been employed in New Haven in his earlier days by Eli Whitney, of cotton gin fame, in the manufacture of Guns for the United States Government. By the advice and assistance of Mr. Whitney he engaged in the making of Gun barrels. In the course of years he forged every kind of Gun barrel that was used by the United States Government in those days, and for a time he also made Hoes and other agricultural implements for use in Connecticut.

Daniel and Hezekiah Scovil began the manufacture of Planters' Hoes in 1844. The business was suggested by Daniel, who resided a few years among the cotton planters of the South and who was impressed with the necessity for a better Hoe than the planters were then using. He and his brother, it is said, were the first in this country to manufacture the Cotton Planters' Hoe by power other than hand labor, and by assiduous and constant application of their energies they developed the business to its present enviable condition, notwithstanding much competition by some who have without warrant used the Scovil name. This Hoe is made especially for use in cultivating cotton, and time has tested its value and standard qualities. The term "Planters' Hoe," we are advised, was first applied to an implement of this character by D. & H. Scovil. For many years the management of this industry devolved on Hezekiah Scovil, whose successful conduct has shown

itself in the constantly increasing output, the product of the past year exceeding in volume that of any year in the history of the business.

Mr. Scovill occupied an honorable place among manufacturers, as building up on the most conservative and painstaking lines an eminently successful business, in which the name of his house as a trade-mark possessed a value almost unique, as in the cotton districts of the South where are multitudes who are unwilling to use Hoes without it. He was a dignified merchant of the old school, not mingling greatly with the trade at large, but highly esteemed by those who knew him.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE,
NORFOLK ST., LONDON, W. C., Jan. 17, 1903.

The Week's Hardware Trade.

MANUFACTURERS and merchants are still cheerful. They quite remind me of Mark Tapley. The home trade is quiet, and what few travelers have gone out are sending in small orders, but they write hopefully of the prospects. In my experience that is precisely what travelers always do. The cold weather (the Thames is partly frozen) has led to a great demand for Skates and Skate Straps, and has also brought with it a number of repeat orders for Heating Stoves and Apparatus. Cycle manufacturers are now fairly busy again in anticipation of spring requirements, and the motor trade is active. There is some small improvement in certain departments of the brass foundry trade, especially Hinges and Door and Window Furniture, but the branch as a whole is dull. In the Cutlery trade the home demand is quiet, but an improving business is being done with foreign markets. Firms who are well established in the South African and South American markets are receiving increasingly large orders from them by every mail, and are full handed in filling them. While the war was on in South Africa, and trade was dull, they piled up stocks, and now they are being drawn upon freely. The demand is expected to expand rapidly. As was shown by the Board of Trade returns, the exports of Cutlery to South Africa during December, 1901, were valued at £12,484; last month the value stood at £17,436, or an increase of nearly £5000. The goods sent out by one Sheffield house, and that are now heavily on order, consist principally of Pocket Knives, Table Knives, Scissors and Razors, most of them of the best quality. The demand for Razors is very brisk. Similar qualities of Cutlery are also being sent to South America in increasing quantities, and the reports from representatives there are encouraging. Firms that do with some other foreign markets have quite another story to tell. Where there has not been an actual falling off in orders, there has been little or no improvement. Of specialties, the United States have taken rather more freely; but in several instances the Colonial requirements have been less active. The export trade is not only much more brisk in the Cutlery trade, but also in Hardware. The exports of leading houses in India, China and other European countries are well maintained, while the expansion of trade to South Africa is still a feature of the market. A number of good lines have come in recently from Canada and from South America. Advices to hand from Australia report that in Sydney general business is somewhat flat, although prices of metals remain firm. A remarkable fact just now is the absence of orders for Harvesting Implements, usually buoyant at this season of the year. The market for Barbed Wire is quiet, and prices are easier. In Melbourne November proved to be the quietest business month of the year. In addition to the prices for heavy metals, Tin Plates are easier, prices of IC Coke being down to 15 shillings per box. Barbed Wire maintains its price, but Fencing Wire and Wire Netting are both easier. There is a considerable demand for Tanks for water storage, and prices range from 32 shillings 6 pence for 100 gallons, 40 shillings for 200 gallons to 70 shillings for 400 gallons. Advices from New Zealand are favorable. Barbed Wire and Wire Netting are in

short supply at Auckland, but prices are kept down by severe competition among rival storekeepers. In Wellington a very active building trade is creating a very large demand for Builders' Hardware and Cement.

British Hardware and Allied Imports.

In my annual report last week I omitted by accident one section which is of interest to American readers—namely, the extent of British purchases of goods in which American exporters may naturally be concerned. I therefore have extracted from official sources the necessary particulars and they are here appended:

	Volume. Year ended December 31, 1901. 1902.		Value. Year ended December 31, 1901. 1902.	
			£	£
Brooms and Brushes, doz.	1,173,520	1,309,465	289,231	317,856
Clocks, parts thereof:				
From Belgium.....			5,780	5,654
From France.....			7,875	7,693
From United States.....			1,744	1,494
From other countries...			1,857	889
Clocks, number:				
From Belgium.....	1,304,685	1,075,028	284,193	235,322
From France.....	59,593	49,018	85,983	77,650
From United States.....	355,390	284,671	93,530	76,081
From other countries...	63,827	82,795	45,103	45,377
Total of Clocks and parts thereof	1,783,495	1,491,512	526,065	450,150
Cutlery, cwts.....	4,190	4,254	35,099	34,001
Cycles (other than Motor Cycles), number.....		14,357		83,302
Parts thereof.....				61,233
Totals			176,355	144,535
Hardware (other than Cutlery), cwts.....	351,907	476,861	1,117,277	1,368,534
Iron and Steel manufactures, tons:				
Girders, Beams, Joists and Pillars:				
From Belgium.....	102,477	104,414	687,175	672,077
From other countries.....	20,208	22,795	141,429	148,400
Totals	122,685	127,209	828,604	820,477
Rails, Steel, for railways or tramways, tons:				
From United States.....	25,543	4,005	187,740	46,814
From other countries.....	29,387	43,956	225,089	286,098
Totals	54,930	47,961	412,829	332,912
Tires and Axles.....	2,475	2,434	36,176	35,248
Nails, Screws and Rivets.....		44,442		567,604
Unenumerated:				
From Germany.....	24,234	22,295	602,991	426,513
From Holland.....	93,180	74,053	1,136,165	871,239
From Belgium.....	81,921	93,333	869,710	857,142
From United States.....	43,483	22,225	689,105	491,318
From other countries.....	21,230	17,929	352,516	242,498
Totals	264,048	229,835	3,650,487	2,888,710
Motor Cars (including Motor Cycles), number.....		3,747		992,234
Parts thereof.....				111,330
Totals				1,103,564

It will not escape notice that the progressive importation of Cutlery, to which in previous years I have drawn attention, was checked last year, the imports of Cutlery showing a slight decline. I take this to be to some extent due to the exceptional demand in America for American products; but the fact that British imports of Cutlery have not increased, but, on the contrary, have receded during a period when American exporters were too busy diligently to attend to the British market, indicates that it is Americans, rather than Germans, who in recent years have made the greatest progress in cultivating this market. It will also be noticed that during 1902 the German market was distinctly slack, and there was a strong tendency to ship German goods to this market at highly competitive rates. The British purchases of Hardware have again advanced, although not to the same extent as during the last few years. In 1901 there was an increase of imported Hardware of £280,000; the increase this year is less than this by nearly £30,000. Another interesting aspect of British imports is the still further decline in Electrical Goods and Apparatus. In 1901 there was a decrease of over £400,000; last year the decrease was over £160,000. Another item of interest is the large sum spent upon Motor Cars and Motor Car parts. The larger part of this is

high class material bought from France. But, bearing in mind how the Americans captured the British market in Cycle parts and accessories at the time of the Cycle boom, I see no reason why the same success should not attend American manufacturers of motors and Motor parts and accessories. As a matter of fact, a large number of American Motors are being sold in this country, but generally they do not compare with the French product.

The Dispute in the Lock Trade.

A fortnight ago it was hoped that the strike in the Lock trade had been brought to a happy termination. An agreement was reached between the masters and the men whereby the men offered to return to work at the old rate of wages, conditionally on a Wages Board being formed at once, with an equal number of masters and men, with an Independent chairman, this board to be permanent. The masters unanimously accepted this offer and expected the men to return to work. Some misunderstanding, however, has cropped up. The men claim that they are entitled at once to go before the board to try to make good their claim for an advance of wages. The masters, on the other hand, say that the board is for the consideration of future differences and not for those connected with the result of the strike. The result is that the strike still continues. It is an unfortunate misunderstanding and is doing a great deal of damage to the Lock trade.

The British Gun Trade.

If any American manufacturers are short of workmen in the Gun trade, they should not waste time in inviting over the British Gun making mechanic. Owing to various causes there is great unemployment among small Arms workers. The Indian Government is laying down plant to make its own small Guns, and this means still further increase in unemployment in factories either under the control of or making for the Government.

Foreign Goods and British Trade Marks.

I remember about two years ago intimating in this column that British manufacturers were getting restive under the present legal provision which enables the makers of silver or E. P. goods to send their goods over to receive the English hall-mark. A statement has been presented to the Board of Trade, and is now being circulated among members of Parliament generally, on behalf of a number of associations, firms and individuals engaged in and connected with the manufacture and distribution of silver, electro plate, jewelry and other goods of precious metals in London, Birmingham and Sheffield. This states that all engaged in these trades in the United Kingdom have had their attention drawn to the declared intention of foreign manufacturers to send goods of the nature manufactured and dealt in by the petitioners from foreign parts into this country, for the purpose of being stamped with the British hall-marks, and sold here in competition with similar wares of British manufacture, and that this intention has been extended to the sending of partly finished goods to this country for the purpose of their being hall-marked, and then shipping them back to their country of origin for the purpose of being finished and distributed in their own and in neutral markets. This declared intention, it is added, is rapidly being carried into effect; and it is submitted that the object of foreign manufacturers is to secure the appearance of the British hall-mark upon their goods, so as to attach to them an indication of British origin, and thus to reap the benefit of the deservedly great reputation and high standard of artistic design and quality which at present appertains in the markets of the world to similar goods of British origin. The remedy to which the trade claim to be entitled could best be afforded them by acting upon the precedent laid down in the Merchandise Marks act of 1887, by which it was enacted that there should be a special hall-mark upon foreign watch cases, which should have none of the well-known characteristics of the existing hall-marks, but should at once make it clear to purchasers that they are not buying British goods, but foreign goods which have been hall-marked in this country, for the purpose only of indicating the standard of the precious metals of which they are made. A draft of a bill to secure these objects is be-

ing submitted to members of the House of Commons; and the hope is expressed that it may be adopted and passed by the Government, following, as it does, the precedent of the watch clauses of the statute just named. The proposed bill is the outcome of very careful consideration by the three trade associations of Birmingham, Sheffield and London, the trade being unanimous on the subject, and it is proposed that a small but representative deputation should approach Gerald Balfour, at the Board of Trade, with a view to it being adopted as a Government measure.

The South African Trade.

For the guidance of those who are thinking of visiting the Transvaal and Orange River Colony, it may be well to inform them that they cannot enter these territories without permits. There will be permit secretaries with powers to issue permits at the following places: Cape Town, Port Elizabeth, East London, Kimberley, Bulawayo, Durban and Bloemfontein (for the Transvaal only). Applications for permits should be made to the Permit Secretary at any of the above places, or at Lourenço Marques, where the British Consul has power to issue them.

Useful bits of evidence are constantly coming to hand tending to show the demand there is in South Africa generally for goods in which Americans can effectively compete. For example, in the new building operations that are in progress in the Transvaal every mechanical resource is being employed, and there is reason to anticipate that by the end of the first decade of this century there will have arisen in Johannesburg and elsewhere blocks of premises surpassing in importance even those which were erected before the war. Details have privately come to notice of large contracts entered into by shipping houses with firms in London and the Midlands, the materials involved being of the most advanced type, and including powerful house lifts, sanitary fittings, carved chimney pieces, velvet carpets, intricate Locks and the like.

Another department of trade in which Americans are deeply concerned is the number of inquiries being made on behalf of South African firms for agricultural and other appliances to be driven by steam and other mechanical powers; in some instances these inquiries are instigated by Boer farmers, who are now disposed to experiment with modern methods. The association of manual implements with native labor has hitherto been the main source of agricultural output in South Africa. It is reasonable to suppose that, with white men working modern machines this output will be enormously increased. Of course, with this increase must come greatly increased orders for Hardware and other goods.

Steps are being taken for the establishment of an American Chamber of Commerce at Johannesburg. A large number of prominent American firms interested have promised their support, and it is expected that before long the American colony in Johannesburg, being organized, will in consequence be very much more influential. In a month or two from now American exporters will be able to write to the secretary of the American Chamber of Commerce in Johannesburg, and by that means, I trust, be enabled greatly to increase their business.

Tariff Revisions in New Zealand.

I observe that in the New Zealand Gazette for November 6, 1902, the following revised decisions under the Customs Import Tariff of New Zealand are recorded:

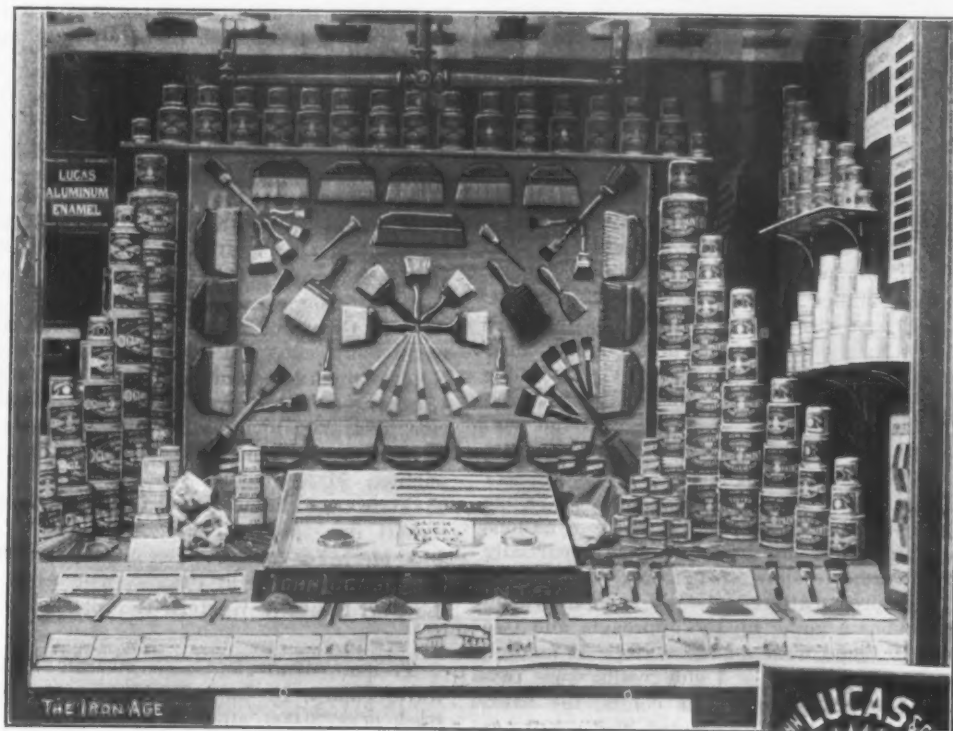
Articles and how classed.	Rates of import duty.
Blocks, Tackle, of galvanized iron:	
As Ship Chandlery, not otherwise enumerated.....	Free.
Blocks, Plummer; also Couplings and Collars for dairy factory:	
As machinery for dairying purposes.....	Free.
Hose and Couplings, pressure and return, for Hydraulic Cranes:	
As parts of Hydraulic Cranes.....	Free.
Mill for grinding sand for use in factories:	
As engineers' machine tools.....	Free.
Oil Engine for Motor Car (Imported separately):	
As Oil Engines.....	Free.
Oil Engine forming part of and being fixed in a Motor Car:	
As Carriages.....	20 % ad valorem.
Opalite Wall Tilings:	
As Glassware, &c.....	20 % ad valorem.

PAINTS IN THE HARDWARE STORE.

BY H. C. W.

AS the show window is a great factor in the sale of Paints, especially in making it a new stock, perhaps the illustrations presented herewith may be of interest to those who have just added or are contem-

ing this line of goods. The arrangement was made by one of the clerks in the store and was fortunate in being a second-prize winner. The maker of the goods was good enough to advise us it would have taken first prize without a question had we confined ourselves to Paints and omitted the Brush exhibit in connection, which was not asked for. The window was dressed with gallons,



Paints in the Hardware Store.—Fig. 1.—Second Prize Window.

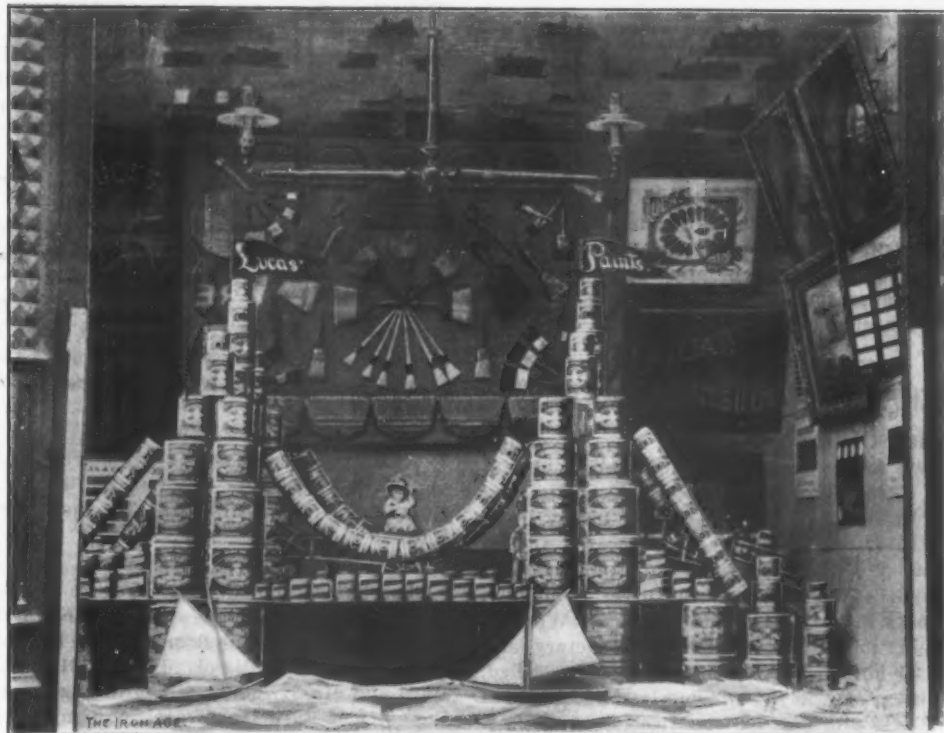


Fig. 2.—Third Prize Window.

plating adding this much talked of stock to their other lines. We believe months of time can be saved in the introduction through a couple of weeks of thorough, good, show window work—of course, coupled with your regulation advertising.

The window illustrated in Fig. 1 was offered in a prize competition for the best show window exhibit by the manufacturers, prizes to be cash, ranging from \$50 to \$5, and open to all dealers in the United States sell-

ing this line of goods. The arrangement was made by one of the clerks in the store and was fortunate in being a second-prize winner. The maker of the goods was good enough to advise us it would have taken first prize without a question had we confined ourselves to Paints and omitted the Brush exhibit in connection, which was not asked for. The window was dressed with gallons, halves, quarts, pints and box sizes. In addition were shown an entire line of dry colors on white paper, immediately across the front, and with these color cards of the various House and Paste Colors, Enamels, Stains and Box Colors. The centerpiece was an American flag done in dry colors—Whiting, Vermillion and Ultramarine Blue—while scattered about were powdered and lump Pumice Stone, package Lamp Black, Mineral Waste and all necessary Painters' Goods. Of course, with

a window of this kind a photograph is rather a poor representation, as all the effect of the bright colors is lost.

The results were well worth all the work put on it. A number of voluntary newspaper articles were given us. People stopped and looked and came in to compliment and comment on it, and for some weeks following we had more Paint trade than for the same number of months that had gone before, and the goods were sold, not to the average painter, but to the user of them, the consumer, and for cash. We immediately decided on another display, as that was the privilege offered in the contest, and as this had seemed a good one, possibly the young man might better the next one. At any rate the chances would be bettered for his being a winner of prizes. This window is illustrated in Fig. 2.

The judges did not think an improvement had been made on the first one, but at the same time this window was also a prize winner, ranking third in the contest. We felt the results of this one were fully equal to those of the first, possibly greater because of its oddity than from any beauty of arrangement. It was not possible to secure all of the large window in the photograph and the approach does not appear. The bottom of the window was covered with a green tint of paper muslin, thrown in loose and in such manner as to make a very clever representation of water. The suspension bridge was made up of all the various packages, from gallons down—plars, approaches, abutments and all—partially hung in a wire frame to show suspension, with two or three small lay figures scattered about. A small wagon and mule were shown going up the approach, and two or three steel sail boats were on the water. It made a clever window. The ceiling and side walls were covered with House designs in various colors, the background with Brushes, signs, &c., and the result, as stated before, was two prizes for one employee out of eight offered by the manufacturers.

Due to the many good articles which have appeared in *The Iron Age* the past few months on the subject of Paints in the Hardware store, there is certainly a great and increasing interest in the subject. The writer is familiar with several concerns who have gone into the line or increased a small one, as a result entirely of these articles. We have also had inquiries from other houses in the State as to our own experience in handling such goods. The trade is bound to be a part of the Hardware business and very largely confined to it. It is profitable, and if handled rightly can in no way be objectionable. I do not know of any line, when complete, and when taken care of, as any other stock should be, that brings better results.

THE RICHARDSON-OLIVER COMPANY.

C. F. RICHARDSON & SON of Athol, Mass., long and well known to the trade as manufacturers of Machinists' and Carpenters' Iron Levels, Transits and Leveling Instruments, and the Oliver & Whitney Company, manufacturers of Milled Machine Screws, also of Athol, on January 1, 1903, consolidated their business under the name of the Richardson-Oliver Company. All the machinery in the plant of the Oliver & Whitney Company is being moved to the Richardson factory, and an additional 25 horse-power engine is being installed. They will continue all the lines formerly made by both companies and will add new articles from time to time. They expect soon to install eight new automatic Screw machines, and a new catalogue will shortly be issued.

W. H. MULLINS, Salem, Ohio, has just completed the purchase of the Watson Fireproof Window Company, including all their machinery and dies and the exclusive right to manufacture under the Watson patents in all States and Territories of the United States, excepting Illinois, Maine, New Hampshire, Vermont, Rhode Island, Massachusetts and the city of Greater New York; and also for export. The company desire to secure manufacturers' agents in every city throughout their

territory, and would be pleased to correspond with parties relative to terms. Catalogues and full information will be cheerfully furnished to all interested parties.

AMONG THE HARDWARE TRADE.

A. D. Sumner & Son have purchased the interest of J. H. Laird in the firm of Sumner, Laird & Co., Hillsboro, Ind., and will continue the Hardware and Implement business at the old stand.

R. J. Folven has disposed of his Hardware business in Mekinock, N. D., to Hensrud Bros.

A. P. Cleland, Macy, Ind., has added to his former stock a line of Well Supplies, Stoves, Buggies, Wagons, Paints and Oils, Farming Implements and Plumbing Goods.

J. C. Comstock and L. W. Copeland have formed a partnership and will open a new Hardware store in Noblesville, Ind., about February 1. They will handle Hardware, Stoves, Agricultural Implements and Buggies. Mr. Comstock has been the business manager and buyer for the firm of Storm, Walitt & Co., as well as partner. Mr. Copeland was formerly financial partner of the firm of Bohanan and Copeland Company.

J. Mertes & Co. have discontinued at Choctaw, O. T., and opened a store at Prague, which is a new town on the Fort Smith & Western Railroad.

Treman, King & Co., wholesale and retail Hardware, Ithaca, N. Y., have incorporated with a capital stock of \$100,000, all paid in. The reasons for the corporation are to enable the house to extend and handle their business more successfully and also admit some of the older and faithful employees of the company to an interest in the ownership as a reward for their long and energetic services. The firm of Treman, King & Co. have been in existence since 1844, when a Hardware store was established by Leonard and Lafayette Treman on the same site where the present large building stands. The firm's name was at first L. & L. Treman. In 1849 Elias Treman was admitted to partnership, and the name changed to Treman Bros. In 1857 Leander R. King was admitted and the firm then assumed the name it now bears. Robert H. Treman was admitted in 1882, and in 1888 Leonard Treman died. Chas. E. Treman entered the concern in 1893, and since 1900, during which both Lafayette Treman and Leander King died, the two brothers, R. H. and C. E. Treman, have conducted the business. The wholesale department of the house covers central and southern New York and northern Pennsylvania.

N. A. Loch has sold a half interest in his Hardware and Farm Implement business at Decatur, Ind., to Levi Linn, formerly of Bluffton. The new style is Loch & Linn.

The partnership between George W. Bard, David P. Schlott, James M. Bard, Albert F. Kramer and A. Raymond Bard, under the firm name of Bard, Schlott & Co., Reading, Pa., was dissolved on the 31st ult. The Messrs. Bard and Mr. Kramer are continuing the business under the style of Bard Hardware Company.

Haven Bros. have purchased the Hardware business formerly conducted by W. Tucker in Reamsville, Kan.

Norman Belcher, Hardware merchant, Pocatello, Idaho, has disposed of a half interest in his business to A. T. Marshall, manager of the Rocky Mountain Bell Telephone in that city, who has resigned that position and will devote all his time and attention to the Hardware business. The new firm style will be Marshall & Belcher. They have taken a five-year lease on a storeroom in the new Masonic Temple. The store is 100 x 30 feet, with full basement.

Howard Hardware Company are successors to Star Hardware Company, at Oelwein, Iowa.

Roebuck-Bryant Hardware Company, Shawnee, O. T., have incorporated with a capital stock of \$15,000, and will continue the business in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, &c.

C. M. Pattillo has succeeded Ed. M. Hart Hardware Company, wholesale and retail, Stamford, Texas. Mr. Pattillo was formerly in business at Hico.

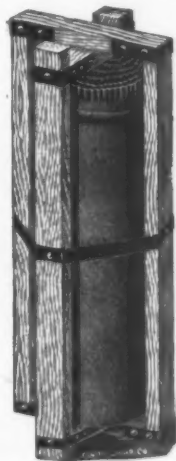
The Hardware firm of Mann & Folck, Onawa, Iowa, have dissolved partnership. A. W. Mann will continue the business under his own name.

W. H. Goodner has purchased the interest of J. W. French in the French-Hansen-Whittle Hardware Company, Harlan, Iowa, and the style has become Goodner-Hansen-Whittle Hardware Company.

The firm of Hibner & Hoover, Du Bois, Pa., wholesale and retail Hardwaremen, who have been in existence over 20 years, were incorporated under the State laws of Pennsylvania on August 6 last, with a capital stock of \$100,000. The territory covered in the jobbing trade is Central and Western Pennsylvania. Three men are kept on the road. The lines handled are Shelf and Heavy Hardware, Builders' Supplies, Buggies, Wagons and Agricultural Implements. There is also a tin shop in connection with the business.

The Edwards Nested Stove Pipe.

The Edwards Mfg. Company, Incorporated, 119 Sycamore street, Cincinnati, Ohio, have recently taken up the manufacture of nested stove pipe, which they are making in all grades of material, including one-pass cold rolled, Wood's refined, polished and planished steel sheets. In the accompanying illustration is shown the method in which 25 joints of this pipe wrapped in paper



The Edwards Nested Stove Pipe.

are packed for shipment, thus securing a material saving in freight space and labor. The company's pipe is made in all the usual sizes. It is simple and easy to fit and erect and is recommended as entirely satisfactory in use. The company are also manufacturing at their factories in Cincinnati and Covington, Ky., a fine line of ornamental stamped work, cornices, statuary and spun work, as well as eave trough, conductor pipe, wire hangers and corrugated iron and steel roofing.

The United States Family Scale.

The cut shown in Fig. 1 represents a scale placed on the market by the manufacturers, Hanson Bros., 18-30 West Randolph street, Chicago, Ill. The most distinguishing feature of the scale is the removable steel post which supports the top plate or pan, Fig. 2. In shipping or packing, the steel post is removed from the top and

inserted in the bottom, as seen in Fig. 1, the plate being shown by the dotted lines underneath the scale proper. In this way the weighing mechanism is protected from breaking or being thrown out of adjustment in ship-



Fig. 1.—The United States Family Scale.

ment, and occupies but half the space which it would otherwise cover. The manufacturers state that the scale boxes are pressed from one solid piece of drawn steel, and for this reason and because the finest steel springs are used, hand made and tempered one at a



Fig. 2.—Removable Steel Post and Top Plate.

time, it is possible for them to guarantee accuracy of weight. The scales have a capacity of 24 pounds by ounces, the diameter of the aluminum dial being 5 1/4 inches.

The Whirligig Ice Cream Truck.

The ice cream truck shown in the accompanying illustration is a simple and unique device for moving ice cream freezers and packers. The truck is 18 inches in



The Whirligig Ice Cream Truck.

diameter, made of poplar in cross layers and provided with four large double wheel ball bearing casters which permit free movement in any direction. The truck is offered by the Horizontal Freezer Company, Chicago, Ill.

The Creasy Ice Breaker No. 49.

The accompanying cut represents a new ice breaker offered by Jos. S. Lovering Wharton, Philadelphia, Pa. This is similar in principle of operation to the other Creasy ice breakers, which have been on the market for the past 20 years. The machine illustrated is made so as to be adapted to the hardest kind of continuous service at high speed, and to take the largest cakes of ice. If so desired, the ice can be fed into it continuously by means of an inclined plane from the ice house or source of supply. A large opening is provided in the heavy iron bed plate beneath the cylinder to permit the broken ice falling through into the chute, or such conveying



The Creasy Ice Breaker No. 49.

mechanism as the requirements of the plant call for, to carry the broken ice to the place where it is to be used. Instead of using a fly wheel for storing power, the revolving cylinder in the machine is extra heavy, weighing about 850 pounds, to serve this purpose and to give long bearing surface for the rivets holding the picks in position on its surface. The picks are forged from high grade steel and are of special design, having a large taper plug on the under surface which fits into tapering holes drilled in the cylinder, to resist the shock of the continuous striking against the ice. They are so riveted that they can be readily replaced. The back cover and the upper part of the side frames are readily removable, thus providing easy access to the picks for sharpening or replacing. The lower part of the front plate can be set at any one of three distances from the face of the cylinder, which provision, in connection with the two different spaced combs, allows a wide variation in the size of broken ice.

The Fountain Lawn Sprinkler.

The accompanying cut represents a lawn sprinkler offered by the Admiral Lamp Company, Marysville,



The Fountain Lawn Sprinkler.

Ohio. The sprinkler is made of heavy brass and is easily moved over the lawn without turning off the water. There is no mechanism about the sprinkler, and being

made of brass it will not rust. In operation it throws a mistlike spray.

The New Chicago Ice Cream Freezer.

The accompanying illustration represents a power ice cream freezer introduced by the Horizontal Freezer Company, Chicago, Ill. The prominent features of the freezer are eccentric, adjustable gears and the weighted plunger lift, arranged so that when the set screw at the



The New Chicago Ice Cream Freezer.

top is loosened the beater is released automatically. The beater is provided with a steel shaft and with spiral floats and double scraper heavily tinned. The beating surface is large, to increase the cream, and when in operation forces the cream outward from the center and upward from the bottom. The machine is continuous running, of 2 horse-power, provided with two pulleys, weighs 700 pounds, and has a capacity for 40 quarts, to be run at any rate of speed desired. The frame is made of one solid piece, while the can is of heavy copper with brass bottom, heavily tinned. The substantial tub is of cedar with grooved staves, flush bottoms. The fly wheel, which also serves as a pulley, is provided with loose pulley and crank attachment. All gears are made adjustable to take up the wear.

The Clauss Baby Tailor Shears No. 3B.

The Clauss Shear Works, 290 Broadway, New York, are offering the shears shown herewith. These are half way between an ordinary bent trimmer and a regular



The Clauss Baby Tailor Shears No. 3B.

tailors' shear, being heavier than the former and lighter than the latter. The makers state that they have never added a new pattern of shear which has had a larger sale at the start than the one illustrated herewith.

Wenzel's Toy Cannon.

The C. E. Wenzel Company, 313 Market street, Newark, N. J., for whom the Paulus Mfg. Company, Newark, are agents, have placed on the market the toy cannon, shown in the accompanying cuts. In Fig. 1 is illustrated a single shooter cannon, on the rear end of the barrel of which the cap is placed. The hammer is drawn back by the aid of a lever. On one side of the hammer is a pin, which after the lever and hammer are brought back to a certain point, slips through a groove on the inner

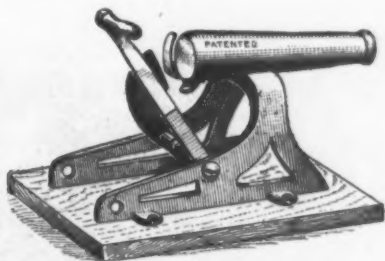


Fig. 1.—Wenzel's Single Shooter Cannon.

side of the lever, thus permitting the hammer to be brought forward with enough force to explode the cap. A rapid firing cannon is shown in Fig. 2, made on the same principle, but having a repeating apparatus attached to it. A channel is riveted to the rear end of the barrel, as shown in the cut. On the axle of the hammer two arms are provided for with a carrier, which is held in position by a small spring. A strip of ammunition is placed in the lower end of the channel and pushed upward, until it touches the extreme end of the

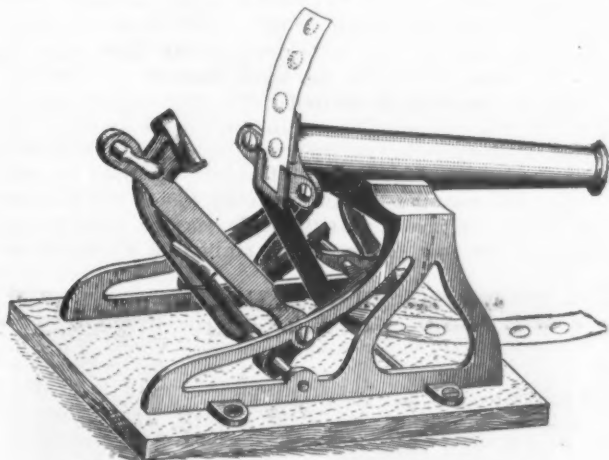


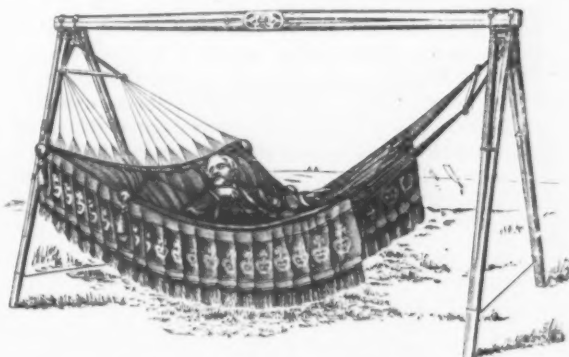
Fig. 2.—Wenzel's Rapid Fire Cannon.

carrier. The moment the hammer is brought away from the rear end of the barrel the two arms, with the carrier, move upward and bring the caps in position for the hammer to explode at the proper moment. On the rear end of the barrel is a small recess, and on the hammer a projection fitting the recess for the purpose of cutting off all waste ammunition, and preventing the explosion of more than one cap at a time. By this mechanism 75 caps a minute may be exploded. The cannon is made of cast iron, and is of a very neat pattern. The company remark that it will not get out of order easily, and that it is harmless and perfectly safe.

Palmer's Patented Reposo Hammock.

The accompanying cut represents a hammock of new construction, put on the market by I. E. Palmer, Middletown, Conn. It is explained that in countries where the hammock is used generally by the natives in place of a bed it is the custom to employ a very wide hammock and to lie either diagonally or directly across it, as such position gives the utmost comfort, eliminating the usual and painful elevation of the lower limbs

which is occasioned by the regular hammock. It is further remarked that it may be observed that even in hammocks of the usual construction many occupants naturally assume this diagonal position in an unconscious search for ease. The hammock illustrated here-



Palmer's Patented Reposo Hammock.

with is constructed as to width and arrangement of pillows so as to make it natural to assume this diagonal position. The woven part of the hammock is 60 inches wide and it is made both in five-eighths color and in full color.

Rural Mail Delivery Boxes.

The Kelly Foundry & Machine Company, 67 Purl street, Goshen, Ind., are offering the mail boxes shown herewith. The Kelly box is made of heavy galvanized steel, semicircular in shape, and has a flat lid. Each box is provided with a hasp for padlock. In the inside of the lid is a receptacle for outgoing mail, which is referred to as a great convenience to the carrier, as it immediately presents to his view the mail, which stands out boldly and is easily grasped. Two bolts passing first through a heavy strap of steel, which serves as a washer, then through the box, fasten it to a post or building. Each box is provided with a self locking signal, which rises at the end of the box and can be seen a great distance. This is to be used by patron and carrier to indicate that



Rural Mail Delivery Boxes.

there is mail in the box. It can be operated only when the box is open, so that it cannot be tampered with. The box is 18 inches long, readily admitting the largest magazines and newspapers. The lid projects sufficiently to allow a gloved hand to grip it freely and open it, so that the entire interior is readily exposed to view. The point is made that no part of the box depends upon rivets or solder, and that it is storm proof, safe and durable. The Goshen box is similar in construction though different in shape, and both have been approved by the Postmaster-General.

The Turner Cluster Arc Gas Light.

The accompanying illustration shows the gas light recently introduced by the Turner Brass Works of Chicago. The principal feature of the Cluster arc lamp is the improved burner through which the gas is supplied to the group or cluster of mantles. Four mantles are used, each controlled by a separate needle point. It is remarked that the consumption of gas is reduced to the lowest point, which, together with its unusually high candle power, makes it one of the most economical and efficient lights on the market, and gives the effect of a big, white electric arc light. So simple is the manage-



The Turner Cluster Arc Gas Light.

ment, it is said, that the least experienced can operate it. The manufacturers state that every part of the lamp is made of the best material; that all machine work is done under their own roof and that the lamps are carefully tested before shipping.

The Waggoner Watchman's Clock.

The Waggoner Watchman Clock Company, with main offices and factory at Grand Rapids, Mich., are placing on the market the watchman's clock shown in the accompanying cuts. The clock is constructed to give an alarm when registering, and will sound an alarm when short circuited by accident or other means, at the same time registering the exact time the circuit was closed. It seems impossible, it is remarked, to destroy the dial or record by closing the circuit because the registering armature or hammer works with a vibrating motion with such rapidity that it is impossible to man-

ipulate the dial. It is explained that the possibility of manipulation has been a great defect in watchman's clocks heretofore, and may be a great injustice to the honest watchman, as it is difficult, if not impossible, to determine whether the false registering was due to the fault of the watchman or to a defect in the mechanism. Should the watchman fail to register for any reason on the clock illustrated, such as sickness or accidental in-



Fig. 1.—The Waggoner Watchman's Clock.

jury, an alarm rings at any place desired until the clock is registered. A valuable feature is the automatic fire alarm device, the action of which will cause a register on the clock to ring an alarm, at the same time an annunciator, indicating on what floor or at what station the fire can be located. It may be arranged to have the alarm sounded continuously from as many different places as are desired, the circuit being controlled by thermostat connections which are operated by heat when the burning building reaches 160 to 200 degrees. A unique feature is that the clock may be made to register its number at the central station on a strip of pa-

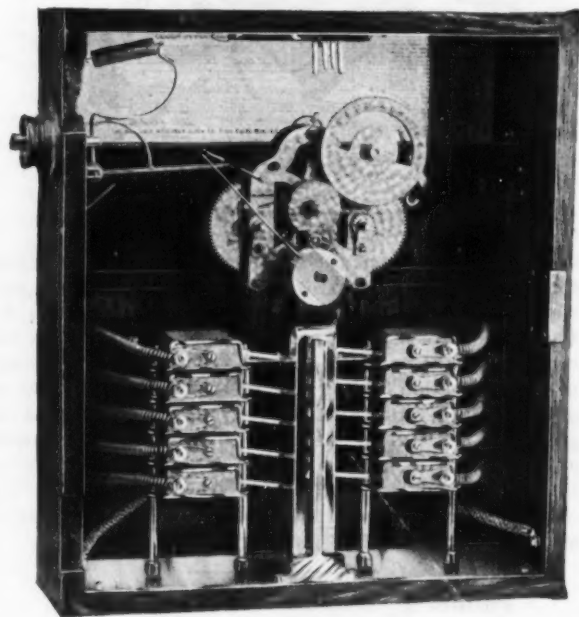


Fig. 2.—Mechanism of the Waggoner Clock.

per should the watchman fail to register in ten minutes over the regular time, the power being derived from a magnetic generator and also from a battery system. The manufacturers claim that insurance companies allow a reduction of 50 cents to \$2.50 per \$1000 upon premiums upon the installation of the clock. It is said to be simple in construction, easily maintained and readily installed.

Current Hardware Prices.

REVISED JANUARY 27, 1903.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 1/2 @ 33 1/2 & 10% signifies that the

price of the goods in question ranges from 33 1/2 per cent. discount to 33 1/2 and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued April, 1902, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters' Blind—

Domestic, per doz. \$3.00.....33 1/2
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....25¢
Taplin's Perfection.....25¢

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Arm and Hammer, Wrought.....\$8.00
Buell Patent Trenton.....\$10.00
Eagle Anvil.....\$7.00
Hay-Budden, Wrought.....\$9.00
Horsehoe Brand, Wrought.....\$9.00

Imported—

Peter Wright & Sons.....\$10.00

Anvil, Vise and Drill—

Millers Falls Co., \$18.00.....50¢
Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Hull Bros. Co.
Lots of 1 doz.....25¢
Smaller Lots.....20¢
Lots of 5 doz.....30%

Augers and Bits—

Cont. Double Spur.....70¢
Boring Machine Augers.....70¢
Car Bits, 12-in. twist.....60¢
Jennings' Pattern.....50¢
Auger Bits.....50¢
Ford's Auger and Car Bits.....40¢
Forster Pat. Auger Bits.....35¢
C. E. Jennings & Co.,
No. 10 ext. lip, R. Jennings' Pat. 25¢
No. 30, R. Jennings' Pat. 40¢
Russell Jennings.....25¢
L'Hommedieu Car Bits.....15¢
Mayhew's Countersink Bits.....45¢
Pugh's Black.....50¢
Pugh's Jennings' Pattern.....35¢
Snell's Auger Bits.....60¢
Snell's Bell Hangers' Bits.....50¢
Snell's Car Bits, 12-in. twist.....60¢
Wright's Jennings Bits (R. Jennings' Pat.).....50%

Bit Stock Drills—

Standard List.....65¢
Expansive Bits—

Clark's small, \$1.50; large, \$3.00.....50¢
Lavigne's Clark's Pattern, No. 1, per doz., \$2.00; No. 2, \$1.80.....50¢
C. E. Jennings & Co., Steer's Pat. 25¢
Swan's.....60%

Gimlet Bits—

Common Double Cut, gro. \$2.50 to \$3.00
German Pattern.....gro. \$5.00 to \$5.25

Hollow Augers—

Bonney Pattern, per doz. \$11.00 to \$11.50
New Patent.....25¢
Universal.....20¢
Wood's Universal.....25%

Ship Augers and Bits—

Ford's.....40¢
Snell's.....40¢
C. E. Jennings & Co.,
L'Hommedieu's.....15¢
Watrous'.....35¢

Awl Hafts, See Hafts, Awl.

Awls—

Brad Awls:
Handled.....gro. \$2.75 to \$3.00
Unhandl'd, Shouldered, gro. 65¢ to 66¢
Unhandl'd, Patent.....gro. 60¢ to 70¢

Peg Awls—

Unhandl'd, Patent.....gro. \$1.00 to \$1.40
Unhandl'd, Shouldered, gro. 65¢ to 70¢

Scratch Awls—

Handled, Common, gro. \$3.50 to \$4.00
Handl'd, Socket, gro. \$1.50 to \$2.00
Barwood.....40%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

First Quality, factory brands.....\$6.00
First Quality, jobbers' brands.....\$5.50
Second Quality.....\$5.00 to \$5.35

Axle Grease—See Grease, Axle.

Axles—

Concord, Loose Collar.....\$4.00
Concord, Solid Collar.....\$4.00
No. 1 Common.....\$4.00
No. 1 1/2 Com. New Style.....\$4.00
No. 2 Solid Collar.....\$4.00
Nos. 11 to 14.....\$5.00 to \$7.00
Nos. 15 to 18.....\$7.00 to \$10.00
Nos. 19 to 22.....\$7.00 to \$10.00

Boxes, Axle—

Common and Concord, not turned.....15¢
Common and Concord, turned.....15¢
Half Patent.....15¢
Balances—Sash—

Caldwell new list.....50¢
Pollman's.....60%

Spring—

Spring Balances.....50¢
Chattillon's:
Light Spz. Balances.....40¢
Straight Balances.....40¢
Circular Balances.....50¢
Large Dial.....30¢
Petouze.....50%

Barb Wire—See Wire, Barb.

Bars—Crow—

Steel Crowbars, 10 to 40 lb., per lb. 29¢ to 35¢

Towel—

No. 10 Ideal, Nickel Plate.....\$8.50
No. 20 Ideal, Brass Finish.....\$8.50

Baskets—

Hoffman's Brick Baskets.....each \$3.25

Beams, Scale—

Scale Beams, List Jan. 12, '92, 40¢ to 100¢
Chattillon's No. 1.....30¢
Chattillon's No. 2.....40%

Beaters—Egg—

Lightning Ch. In, per doz. \$1.15; per gro. \$12.00
National Mfg. Co.:
No. 1 Dover, Family size.....\$7.00
No. 2 Dover, Hotel size.....14.00
Taplin Mfg. Co.:
No. 99 Improved Dover.....\$6.50
No. 75 Improved Dover.....\$7.50
No. 75-3 Imp'd Dover, Fin'd.....\$8.00
No. 100 Improved D. ver.....\$8.00
No. 102 Improved Dover, Tin'd.....\$9.50
No. 150 Improved Dover, Hotel.....\$15.00
No. 32 Imp'd Dover, Hotel, Fin'd.....\$7.00
No. 200 Imp'd Dover Tumbler, Tin'd.....\$9.00
No. 32 Imp'd Dover Mammoth, 3 doz.....\$27.00
Wonder (S. S. & Co.).....\$8.00

Bellows—

Blacksmith, Standard List, 70¢ to 100¢
Blacksmiths'—
Inch.....\$3.35 35 35 35 40
Each.....\$3.50 3.75 4.25 4.50 5.35 6.15
Extra Length:
Each.....\$4.00 4.55 5.10 5.60 6.40 7.50

Molders—

Inch.....9 10 11 12 14 16
Doz.....\$6.75 7.35 8.50 9.50 12.00 14.50
Hand—
Inch.....7 8 9 10 12
Doz.....\$4.75 5.25 5.75 6.25 7.00 8.00

Bells—Cow—

Ordinary goods.....75¢
High grade.....70¢
Jersey.....75¢
Texas Star.....50%

Door—

Abbe's Gong.....45¢
Barton Gong.....55¢
Home, R. & E. Mfg. Co.'s.....55¢
Lever and Pull, Sargent's.....60¢
Yankee Gong.....55%

Hand—

Hand Bells, Polished.....60¢
White Metal.....55¢
Nickel Plated.....50¢
Swiss.....60¢
Cone's Globe Hand Bells.....50¢
Silver Chime.....50%

Miscellaneous—

Farm Bells.....lb. 2¢ to 3¢
Steel Alloy Church and School.....60¢
National Bell Foundry Co.:
Superior Cast Steel Church and School Bells.....50¢
American Tube & Stamp Co. Gongs.....70¢
Trip Gong Bells.....55¢

Belting—Rubber—

Agricultural (Low Grade).....75¢
Common Standard.....75¢
Standard.....70¢
Extra.....60¢
High Grade.....50¢

Leather—

Extra Heavy, Short Lap.....80¢

Regular Short Lap 60¢ to 100¢

Standard.....70¢
Light Standard.....70¢
Cut Leather Lacing.....60¢
Leather Lacing Sides, per sq. ft. 15¢

Cotton—

Rossendale-Roddaway B. & H. Co.:
Sphinx Brand.....60¢
Durable Brand.....70%

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40¢
Green River Tire Benders and Upsetters.....50¢
Detroit Stoddard's Lightning Tire Upsetters, No. 1, \$3.75; No. 2, \$6.50; No. 3, \$9.50; No. 4, \$14.75; No. 5, \$18.75.

Bicycle Goods—

John S. Long's Son's 1903 List:
Chain.....50¢
Spokes.....50¢
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks—Tackle—

Common Wooden.....70¢
Cleveland Steel.....60¢
Hollow Steel Blocks, with Ford's Patent Sheaves.....50¢
Lane's Patent Automatic Lock and Junior.....30¢
Stowell's Novel, No. 1, \$1.00; No. 2, \$1.50; No. 3, \$2.00; No. 4, \$2.50; No. 5, \$3.00; No. 6, \$3.50; No. 7, \$4.00; No. 8, \$4.50; No. 9, \$5.00; No. 10, \$5.50; No. 11, \$6.00; No. 12, \$6.50; No. 13, \$7.00; No. 14, \$7.50; No. 15, \$8.00; No. 16, \$8.50; No. 17, \$9.00; No. 18, \$9.50; No. 19, \$10.00; No. 20, \$10.50; No. 21, \$11.00; No. 22, \$11.50; No. 23, \$12.00; No. 24, \$12.50; No. 25, \$13.00; No. 26, \$13.50; No. 27, \$14.00; No. 28, \$14.50; No. 29, \$15.00; No. 30, \$15.50; No. 31, \$16.00; No. 32, \$16.50; No. 33, \$17.00; No. 34, \$17.50; No. 35, \$18.00; No. 36, \$18.50; No. 37, \$19.00; No. 38, \$19.50; No. 39, \$20.00; No. 40, \$20.50; No. 41, \$21.00; No. 42, \$21.50; No. 43, \$22.00; No. 44, \$22.50; No. 45, \$23.00; No. 46, \$23.50; No. 47, \$24.00; No. 48, \$24.50; No. 49, \$25.00; No. 50, \$25.50; No. 51, \$26.00; No. 52, \$26.50; No. 53, \$27.00; No. 54, \$27.50; No. 55, \$28.00; No. 56, \$28.50; No. 57, \$29.00; No. 58, \$29.50; No. 59, \$30.00; No. 60, \$30.50; No. 61, \$31.00; No. 62, \$31.50; No. 63, \$32.00; No. 64, \$32.50; No. 65, \$33.00; No. 66, \$33.50; No. 67, \$34.00; No. 68, \$34.50; No. 69, \$35.00; No. 70, \$35.50; No. 71, \$36.00; No. 72, \$36.50; No. 73, \$37.00; No. 74, \$37.50; No. 75, \$38.00; No. 76, \$38.50; No. 77, \$39.00; No. 78, \$39.50; No. 79, \$40.00; No. 80, \$40.50; No. 81, \$41.00; No. 82, \$41.50; No. 83, \$42.00; No. 84, \$42.50; No. 85, \$43.00; No. 86, \$43.50; No. 87, \$44.00; No. 88, \$44.50; No. 89, \$45.00; No. 90, \$45.50; No. 91, \$46.00; No. 92, \$46.50; No. 93, \$47.00; No. 94, \$47.50; No. 95, \$48.00; No. 96, \$48.50; No. 97, \$49.00; No. 98, \$49.50; No. 99, \$50.00; No. 100, \$50.50; No. 101, \$51.00; No. 102, \$51.50; No. 103, \$52.00; No. 104, \$52.50; No. 105, \$53.00; No. 106, \$53.50; No. 107, \$54.00; No. 108, \$54.50; No. 109, \$55.00; No. 110, \$55.50; No. 111, \$56.00; No. 112, \$56.50; No. 113, \$57.00; No. 114, \$57.50; No. 115, \$58.00; No. 116, \$58.50; No. 117, \$59.00; No. 118, \$59.50; No. 119, \$60.00; No. 120, \$60.50; No. 121, \$61.00; No. 122, \$61.50; No. 123, \$62.00; No. 124, \$62.50; No. 125, \$63.00; No. 126, \$63.50; No. 127, \$64.00; No. 128, \$64.50; No. 129, \$65.00; No. 130, \$65.50; No. 131, \$66.00; No. 132, \$66.50; No. 133, \$67.00; No. 134, \$67.50; No. 135, \$68.00; No. 136, \$68.50; No. 137, \$69.00; No. 138, \$69.50; No. 139, \$70.00; No. 140, \$70.50; No. 141, \$71.00; No. 142, \$71.50; No. 143, \$72.00; No. 144, \$72.50; No. 145, \$73.00; No. 146, \$73.50; No. 147, \$74.00; No. 148, \$74.50; No. 149, \$75.00; No. 150, \$75.50; No. 151, \$76.00; No. 152, \$76.50; No. 153, \$77.00; No. 154, \$77.50; No. 155, \$78.00; No. 156, \$78.50; No. 157, \$79.00; No. 158, \$79.50; No. 159, \$80.00; No. 160, \$80.50; No. 161, \$81.00; No. 162, \$81.50; No. 163, \$82.00; No. 164, \$82.50; No. 165, \$83.00; No. 166, \$83.50; No. 167, \$84.00; No. 168, \$84.50; No. 169, \$85.00; No. 170, \$85.50; No. 171, \$86.00; No. 172, \$86.50; No. 173, \$87.00; No. 174, \$87.50; No. 175, \$88.00; No. 176, \$88.50; No. 177, \$89.00; No. 178, \$89.50; No. 179, \$90.00; No. 180, \$90.50; No. 181, \$91.00; No. 182, \$91.50; No. 183, \$92.00; No. 184, \$92.50; No. 185, \$93.00; No. 186, \$93.50; No. 187, \$94.00; No. 188, \$94.50; No. 189, \$95.00; No. 190, \$95.50; No. 191, \$96.00; No. 192, \$96.50; No. 193, \$97.00; No. 194, \$97.50; No. 195, \$98.00; No. 196, \$98.50; No. 197, \$99.00; No. 198, \$99.50; No. 199, \$100.00; No. 200, \$100.50; No. 201, \$101.00; No. 202, \$101.50; No. 203, \$102.00; No. 204, \$102.50; No. 205, \$103.00; No. 206, \$103.50; No. 207, \$104.00; No. 208, \$104.50; No. 209, \$105.00; No. 210, \$105.50; No. 211, \$106.00; No. 212, \$106.50; No. 213, \$107.00; No. 214, \$107.50; No. 215, \$108.00; No. 216, \$108.50; No. 217, \$109.00; No. 218, \$109.50; No. 219, \$110.00; No. 220, \$110.50; No. 221, \$111.00; No. 222, \$111.50; No. 223, \$112.00; No. 224, \$112.50; No. 225, \$113.00; No. 226, \$113.50; No. 227, \$114.00; No. 228, \$114.50; No. 229, \$115.00; No. 230, \$115.50; No. 231, \$116.00; No. 232, \$116.50; No. 233, \$117.00; No. 234, \$117.50; No. 235, \$118.00; No. 236, \$118.50; No. 237, \$119.00; No. 238, \$119.50; No. 239, \$120.00; No. 240, \$120.50; No. 241, \$121.00; No. 242, \$121.50; No. 243, \$122.00; No. 244, \$122.50; No. 245, \$123.00; No. 246, \$123.50; No. 247, \$124.00; No. 248, \$124.50; No. 249, \$125.00; No. 250, \$125.50; No. 251, \$126.00; No. 252, \$126.50; No. 253, \$127.00; No. 254, \$127.50; No. 255, \$128.00; No. 256, \$128.50; No. 257, \$129.00; No. 258, \$129.50; No. 259, \$130.00; No. 260, \$130.50; No. 261, \$131.00; No. 262, \$131.50; No. 263, \$132.00; No. 264, \$132.50; No. 265, \$133.00; No. 266, \$133.50; No. 267, \$134.00; No. 268, \$134.50; No. 269, \$135.00; No. 270, \$135.50; No. 271, \$136.00; No. 272, \$136.50; No. 273, \$137.00; No. 274, \$137.50; No. 275, \$138.00; No. 276, \$138.50; No. 277, \$139.00; No. 278, \$139.50; No. 279, \$140.00; No. 280, \$140.50; No. 281, \$141.00; No. 282, \$141.50; No. 283, \$142.00; No. 284, \$142.50; No. 285, \$143.00; No. 286, \$143.50; No. 287, \$144.00; No. 288, \$144.50; No. 289, \$145.00; No. 290, \$145.50; No. 291, \$146.00; No. 292, \$146.50; No. 293, \$147.00; No. 294, \$147.50; No. 295, \$148.00; No. 296, \$148.50; No. 297, \$149.00; No. 298, \$149.50; No. 299, \$150.00; No. 300, \$150.50; No. 301, \$151.00; No. 302, \$151.50; No. 303, \$152.00; No. 304, \$152.50; No. 305, \$153.00; No. 306, \$153.50; No. 307, \$154.00; No. 308, \$154.50; No. 309, \$155.00; No. 310, \$155.50; No. 311, \$156.00; No. 312, \$156.50; No. 313, \$157.00; No. 314, \$157.50; No. 315, \$158.00; No. 316, \$158.50; No. 317, \$159.00; No. 318, \$159.50; No. 319, \$160.00; No. 320, \$160.50; No. 321, \$161.00; No. 322, \$161.50; No. 323, \$162.00; No. 324, \$162.50; No. 325, \$163.00; No. 326, \$163.50; No. 327, \$164.00; No. 328, \$164.50; No. 329, \$165.00; No. 330, \$165.50; No. 331, \$166.00; No. 332, \$166.50; No. 333, \$167.00; No. 334, \$167.50; No. 335, \$168.00; No. 336, \$168.50; No. 337, \$169.00; No. 338, \$169.50; No. 339, \$170.00; No. 340, \$170.50; No. 341, \$171.00; No. 342, \$171.50; No. 343, \$172.00; No. 344, \$172.50; No. 345, \$173.00; No. 346, \$173.50; No. 347, \$174.00; No. 348, \$174.50; No. 349, \$175.00; No. 350, \$175.50; No. 351, \$176.00; No. 352, \$176.50; No. 353, \$177.00; No. 354, \$177.50; No. 355, \$178.00; No. 356, \$178.50; No. 357, \$179.00; No. 358, \$179.50; No. 359, \$180.00; No. 360, \$180.50; No. 361, \$181.00; No. 362, \$181.50; No. 363, \$182.00; No. 364, \$182.50; No. 365, \$183.00; No. 366, \$183.50; No. 367, \$184.00; No. 368, \$184.50; No. 369, \$185.00; No. 370, \$185.50; No. 371, \$186.00; No. 372, \$186.50; No. 373, \$187.00; No. 374, \$187.50; No. 375, \$188.00; No. 376, \$188.50; No. 377, \$189.00; No. 378, \$189.50; No. 379, \$190.00; No. 380, \$190.50; No. 381, \$191.00; No. 382, \$191.50; No. 383, \$192.00; No. 384, \$192.50; No. 385, \$193.00; No. 386, \$193.50; No. 387, \$194.00; No. 388, \$194.50; No. 389, \$195.00; No. 390, \$195.50; No. 391, \$196.00; No. 392, \$196.50; No. 393, \$197.00; No. 394, \$197.50; No. 395, \$198.00; No. 396, \$198.50; No. 397, \$199.00; No. 398, \$199.50; No. 399, \$200.00; No. 400, \$200.50; No. 401, \$201.00; No. 402, \$201.50; No. 403, \$202.00; No. 404, \$202.50; No. 405, \$203.00; No. 406, \$203.50; No. 407, \$204.00; No. 408, \$204.50; No. 409, \$2

Gates, Molasses and Oil -

Stebbins' 80@80&35
Gauges—
 Marking, Mortise, etc. 55¢100@55¢100¢100
 Chapin Stephens Co. Gauge 30¢100@100¢100
 Fulton's Butt Gauge 30¢100
 Stanley R. & L. Co.'s Butt & Habbet Gauge 20¢20¢100¢100
 Wire, Brown & Sharpe's 35¢
 Wire, Morse's 30¢100
 Wire P. S. & W. Co. 30¢100

Climbers—Single Cut—
 Nail, Metal, Assorted, gro. \$1.00@1.50
 Spike, Metal, Assorted, gro. \$2.80@3.25
 Nail, Wood Handled, Assorted, gro. \$1.75@2.00
 Spike, Wood Handled, Assorted, gro. \$2.25@3.50

Glass, American Window

Jobs' List, Dec. 16, 1902
 From store. Single and Double 90¢100¢
 F. O. B. factory, carload lots, Single and Double, 50¢20¢25¢
 2000 box lots, 90¢25¢

Glasses Level—

Chapin-Stephens Co. 60¢60¢100¢100

Glue—Liquid, Fish—

List A, Bottles or Cans, with Brush, 37¢40¢
 List B, Cans (1/2 pts., pts., qts.) 33¢48¢
 List C, Cans (1/2 gal., gal.), 25¢45¢
 International Glue Co. (Martin's) 4¢10¢50¢

Grease, Axle—

Common Grade, gro. \$5.00@6.00
 Dixon's Everlasting, 10-lb pails, ea. 55¢
 Dixon's Everlasting, in box, 1 lb. \$1.20; 2 lb. \$2.00

Snow Flake—

1 qt. cans, per doz. \$2.00; 2 qt., \$3.20;
 1 gal. cans per doz. \$6.00; 3 gal. \$16.00; 5 gal. \$24.00

Griddles, Soapstone—

Pike Mfg. Co. 33¢33¢100

Grindstones—

Bicycle Emery Grinder 80.50
 Bicycle Grindstones, each \$2.50@3.00

Pike Mfg. Co.—

Improved Family Grindstone, es. per inch, per doz. \$2.00 (33¢) 33¢

Pike Mower Knife and Tool, Grinder, each, \$4.00

Velox Rail Bearing, mounted, Angle Iron Frames, each, \$3.25

Guards Snow—

Cleveland Wire Spring Co. \$9.00
 Galv. Steel 1000 \$18.00
 Copper 1090 \$18.00

Halters and Ties—

Covert Mfg. Co. 45¢25¢

Web 40¢25¢

Jute Rope 45¢25¢

Sisal Rope 20¢45¢

Covert's Saddlery Works: Web and Leather Halters, 70¢

Jute and Manila Rope Halters, 70¢

Sisal Rope Halters, 60¢20¢

Jute, Manila and Cotton Rope Ties, 70¢

Manila Rope Ties, 60¢100¢

Hammers—

Handled Hammers—

Heller's Machinists', 40¢100@40¢100¢

Heller's Farriers', 40¢100@40¢100¢

Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50, \$1.75

Peck, Stow & Wilcox, 40¢40¢100¢

Fayette H. Plumb, 50¢

Plumb, A. E. Nall, 30¢47¢@30¢47¢100¢

Engineers' and B. S. Hand, 50¢75¢30¢100¢100¢

Machinists' Hammers 30¢50¢100¢

Riveting and Tinner, 40¢30¢40¢100¢

Bargent's C. S. New List, 40¢40¢

Heavy Hammers and Sledges—

\$1b. and under, lb. 45¢ 75¢50¢75

2 to 5 lb. lb. 30¢ 40¢

Over 5 lb. lb. 30¢ 40¢

Wilkinson's Smiths' 94¢@100¢

Handles—

Agricultural Tool Handles—

Aze, Pick, etc. 60¢50¢100¢

Hoe, Rake, etc. 60¢50¢100¢

Fork, Shovel, Spade, etc. 60¢

Long Handles, 60¢

D Handles, 50¢

Cross-Cut Saw Handles—

Atkins', 40¢50¢

Champion, 45¢45¢100¢

Diston', 50¢

Mechanics' Tool Handles—

Auger, assorted, gro. \$2.30@2.50

Brad Awt., gro. \$1.25@1.50

Chisel Handles:

Apple Tanged Firmer, gro. ass'd, \$2.25@2.35; large, \$2.50@2.60

Hickory Tanged Firmer, gro. ass'd, \$1.75@2.20; large, \$3.00@3.20

Apple Socket Firmer, gro. ass'd, \$1.70@1.85; large, \$2.00@2.25

Hickory Socket Firmer, gro. ass'd, \$1.60@1.75; large, \$1.75@2.00

Hickory Socket Framing, gro. ass'd, \$2.50@2.75; large, \$2.85@3.05

File, assorted, gro. \$1.00@1.15

Hammer, Hatthel, Aze, etc., 60¢

Hand Saw, Furnished, doz. 70¢75¢

Not Furnished, 55¢60¢

Plane Handles:

Jack, doz. 25¢; Jack Bolted, 55¢60¢

Fore, doz. 35¢38¢; Fore, Bolted, 70¢75¢

Chapin-Stephens Co.:

Carving Tool, 40¢41¢100¢

Chisel, 65¢65¢100¢

File and Awt., 65¢65¢100¢

Saw, 40¢40¢100¢

Screw Driver, 40¢40¢100¢

Millers Falls Adj. and Ratchet Auger Handles, 15¢100¢

Nicholson Simplicity File Handle, gro. 80¢80¢100¢

Hangers—

Barn Door, New Pattern, Round

Groove, Regular: 3 4 5 6 8

Single Doz. \$0.25 1.20 1.50 1.90 2.30

Barn Door, New English Pattern, Check Back, Regular:

Inch 3 4 5 6

Single Doz. \$1.10 1.00 2.15 2.70

Allith Mfg. Co. R-Hable, per doz. \$15.00

Chicago Spring Butt Co.:

Friction, 25¢

Oscillating, 25¢

Big Twin, 25¢

Chisholm & Moore Mfg. Co.:

Baggage Car Door, 50¢

Elevator, 40¢

Railroad, 55¢

Cronk & Carrier Mfg. Co.:

Loose Axle, 60¢

Roller Bearing, 60¢100¢

Lane Bros. Co.:

Parlor Ball Bearing, \$4.15

Parlor, Standard, \$3.35

Parlor, New Model, \$2.85

Parlor New Champion, \$2.25

Barn Door, Standard, 50¢100¢100¢

Covered, 50¢100¢

Lawrence Bros.:

Advance, 60¢

Cleveland, 60¢100¢

Crown, 60¢

Giant, 50¢100¢

New York, 60¢100¢

No. 2, Standard, \$1.15

Hinged Hanger, \$1.15

Meyers' Station Hangers, 50¢100¢ (not)

C. S. Smith Mfg. Co.:

Lundy Parlor Door, 50¢100¢

Monarch Barn Door, 50¢100¢

Never Jam Hinge, 60¢100¢

Peerless, 60¢100¢

Perfection, 70¢55¢

Phoenix, 70¢55¢

Wagner's Adjustable, 70¢100¢

Warehouse Anti-Friction, 60¢

Stowell Mfg. and Foundry Co.:

Acme Parlor Ball Bearing, 40¢

Atlas, 40¢

Badger Barn Door, 50¢

Baggage Car Door, 50¢

Climax Anti-Friction, 50¢

Elevator, 40¢

Express, 50¢

Intestate, 50¢

Lundy Parlor Door, 50¢

Magie, 50¢

Matchless, 60¢

Nansen, 60¢100¢

Railroad, 50¢

Street Car Door, 50¢

Steel, Nos. 300, 400, 500, 40¢15¢

Stowell Parlor Door, 50¢

Wild West, Nos. 301, 401, 501, 5¢

Zenith for Wood Tracks, 50¢

A. L. Sweet Iron Works:

Eagle, 60¢100¢

Hylo, 50¢

Perfection, 60¢

Pilot, 60¢

Taylor & Boggs Fy Cos., 50¢15¢10¢

Wilcox Mfg. Co.:

Bike Roller Bearing, 60¢100¢

C. J. Roller Bearing, 60¢100¢

Cycle Ball Bearing, 50¢

Dwight, 40¢

Ives, Wood Track, 60¢100¢

L. T. Roller Bearing, 60¢100¢

New Era Roller Bearing, 50¢100¢

O. K. Roller Bearing, 60¢100¢

Prindle, Wood Track, 60¢

Richards' Wood Track, 60¢

Richards' Steel Track, 60¢100¢

Spencer Roller Bearing, 60¢100¢

Tandem Nos. 1 and 2, 40¢

Underwriters' Roller Bearing, 40¢

Velvet, 50¢

Wilcox Auditorium Ball Bearing, 30¢

Wilcox Barn Trolley No. 125, 40¢

Wilcox Elevator Door Hangers, 40¢

Nos. 112 and 123, 50¢

Wilcox Elevator Door Hangers, 40¢

No. 132, 40¢

Wilcox Fire Trolley, Roller Bearing, 30¢

Wilcox Le Roy Noiseless Ball Bearing, 40¢

Wilcox New Century, 50¢100¢100¢

Wilcox O. K. Steel Track, 50¢

Wilcox O. K. Trolley, 50¢

Wilcox Trolley Ball Bearing, 40¢

Wilcox Wideman Narrow Gauge Ball Bearing, 40¢

For Track, see Rail.

Hasps—

McKinney's Perfect Hasp 50¢50¢ 50¢

Wrongly Hasps, Staples, etc.—See Wrought Goods.

Hatchets—

Best Brands, 50¢50¢100¢

Cheaper Brands, 70¢80¢100¢

Note.—Net prices often made.

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1898 O. P. Niagara; Clarks O. P.; Clark's Tip; Buffalo.)

No. 1 3 5

Doz. pair, \$0.85 1.75 3.50

Mortise Shutter: (L. & P. O. S., Dixie, etc.)

No. 1 1 1/2 2 3 1/2

Doz. pair, \$0.70 .85 .60 .55

Mortise Reversible Shutter, (Buffalo, etc.)

No. 1 1 1/2 2

Doz. pair, \$0.75 .80 .65

Norris Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50

Parker, 70¢75¢

Reading's Gravity, 75¢100¢

Sargent's, Nos. 1, 3, 5, 11 & 13, 70¢100¢

Stanley's Steel Gravity Blind Hinges, 70¢100¢

with screws, \$1.15

Wrightsville Hardware Co.:

O. S. Lull & Porter, 7 & 35¢

Acme, Lull & Porter, 75¢

Queen City Reversible, 75¢

Stenger's Positive Locking, Nos. 1 & 2, 70¢100¢

Shepard's Nolaesens, Nos. 60, 65, 68, 70¢100¢

Niagara, Gravity Locking, Nos. 1, 3 & 5, 75¢

1898, Old Pat'n, Nos. 1, 3 & 5, 75¢

Tip Pat'n, Nos. 1, 3 & 5, 75¢

Buffalo Gravity Locking, Nos. 1, 3 & 5, 75¢

Shepard's Double Locking, Nos. 20 & 25, 70¢

Champion Gravity Locking, No. 75, 75¢

Steamboat Gravity Locking, No. 10, 75¢

Pioneer, Nos. 100, 45 & 55, 75¢

Empire, Nos. 101 & 103, 70¢

W. H. Co.'s Mortise Gravity Locking, No. 2, 90¢

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No. 1 2 3

Hinges with Latches, \$2.00 2.70 3.00

Hinges only, \$1.10 2.05 3.20

Latches only, 70 70 35

New England:

With Latch, doz. \$2.50

Without Latch, doz. \$1.80

Reversible Self-Closing:

Mining—
Buffalo, $\$13.00$
Miscellaneous—
Farriers, $\$2.00$
Wootenholm's, $\$3.00$

Knobs—
Base, 2 1/2 inch, Birch, or Maple,
Rubber tip, gro. $\$1.10$
Carriage, Jap. all sizes, $\$2.50$
Door, Mineral, doz. $\$6.00$
Door, Por. Jap. d. $\$2.50$
Door, Por. Nickel, doz. $\$2.15$
Bardley's Wood Door, Shutter, $\$1.15$
Picture, Sargent's, $\$6.00$

Lacing Leather—
See Belting Leather—
Ladders Step Etc.—
Goshen Mfg. Co.'s step, etc. $\$6.00$
Lane's Store, $\$2.50$
Myers Noisels, Store Ladders, $\$3.00$

Ladies—Melting—
L. & W. Mfg. Co., $\$2.50$
P. S. & W., $\$2.50$
Reading, $\$2.50$
Sargent's, $\$2.50$

Lanterns—Tubular—
Regular Tubular, doz. $\$4.50$
Light Tubular, doz. $\$4.75$
Hight Tubular, doz. $\$4.75$
Other Styles, $\$4.00$
Bull's Eye Police
No. 1, 2 1/4 inch, $\$2.50$
No. 2, 3 inch, $\$2.75$

Latches—Gate—
Hoffman's Safety Gate, $\$2.00$
Thumb—
Roggin's Latches, with screw, $\$3.50$
Leaders Cattle—
Small, doz. $\$5.00$; large, $\$6.00$
Covert Mfg. Co., $\$5.25$

Lifters, Transom—
Solid Grip, Payson Mfg. Co., $\$8.00$
K. & L., $\$3.35$

Lines—
Wire Clothes, Nos. 13 19 20
100 feet, $\$2.80$ $\$3.00$ $\$3.65$
75 feet, $\$1.80$ $\$1.70$ $\$1.30$
Osawan Mills,
Crown Solid Braided Chalk, $\$3.45$
Mason's, No. 0 to No. 5, $\$3.35$
Samson Cordage Chalk, No. 0 to 3, $\$1.00$
Silver Lake Braided Chalk, No. 0, $\$6.00$
No. 1, $\$6.00$; No. 2, $\$7.00$; No. 3, $\$7.50$
W. G. R., $\$3.00$

Locks—Cabinet—
Cabinet Locks, $\$3.45$
Door Locks, Latches, &c.,
[Net prices are very often made on
these goods.]
Reading Hardware Co., $\$5.00$
H. & E. Mfg. Co., $\$4.00$
Sargent & Co., $\$4.00$
Elevator—
Stowell's, $\$4.00$

Padlocks—
Wrought Iron, $\$7.50$
R. & E. Mfg. Co. Wrt. Steel and Brass,
75¢ to $\$1.00$

Sash, &c.—
Fitch's:
Bronze and Brass, $\$6.45$
Iron, $\$7.00$
Ives' Patent,
Bronze and Brass, $\$5.45$
Crescent, $\$6.00$
Iron, $\$6.25$
Wrought Bronze and Brass, $\$5.00$
Wrought Steel, $\$5.00$
Payson's signal, $\$6.00$

Machines—Boring—
Com., Upright, Without Augers, $\$2.00$
Com., Angular, Without Augers, $\$2.25$
Without Augers,
R. & E. Mfg. Co.: Upright, Angular,
Improved No. 3, $\$4.25$ No. 1, $\$3.00$
Improved No. 4, $\$3.75$ No. 2, $\$3.38$
Improved No. 5, $\$2.75$
Jennings, No. 4, $\$3.15$ No. 1, $\$2.50$
Millers' Falls, $\$2.75$
Snell's, Rice's Pat. $\$2.50$ $\$2.75$

Hoisting—
Moore's Anti-Friction Differential Pul-
ley Block, $\$3.00$
Moore's Hand Hoist, with Lock Brake, $\$2.00$
Moore's Portable Pneumatic Hoist, $\$2.50$
Ice Cutting—
Chandler's, $\$1.50$

Wayne American—
Western Star, No. 2, $\$28.00$
Western Star, No. 3, $\$30.00$
Et. Louis, No. 41, $\$30.00$

Mallets—
Hickory, $\$4.50$
Lignum vitae, $\$4.50$
Tinnars', Hickory and Applewood,
doz. $\$3.00$

Mats—Door—
Elastic Steel (W. G. Co.), $\$1.00$
Mattocks—
See Picks and Mattocks,
Menders, Hose—
Robinson's Hose Mender, $\$2.00$

Milk Cans—See Cans, Milk
Mills—Coffee, etc.—
Enterprise Mfg. Co., $\$2.50$
Hoffman's Side, Coffee and Spice,
doz. $\$1.25$

National, list Jan. 1, '94—
Parker's Columbiad Victoria, $\$6.00$
Parker's Box and Slide, $\$6.00$
Swift, Lane Bros Co., $\$3.00$

Mowers Lawn—
Net prices are generally quoted.
Cheap, all sizes, $\$1.90$ to $\$1.95$
Good, all sizes, $\$2.25$ to $\$2.50$
10 12 14 16 inch
High Grade $\$4.25$ $\$4.50$ $\$4.75$ $\$5.00$
Continental, $\$6.00$
Great American, $\$7.00$
Great American Ball Bearing, $\$6.00$
Quaker City, $\$7.00$
Pennsylvania, $\$6.00$
Pennsylvania's Fall Year, $\$6.00$
Pennsylvania Golf, $\$6.00$
Pennsylvania Horse, $\$6.00$
Pennsylvania Pony, $\$6.00$

Philadelphia:
Styles M., S., C., K., T. $\$7.00$
Style A, all steel, $\$6.00$
Style B, Low Wheel, $\$6.00$
Style E, High Wheel, $\$6.00$
Drexel and Gold Coin, low list, $\$5.00$

Nails—
Cut and Wire. See Trade Report.
Wire Nail and Brads, Papered.
List July 20, 1899.
85¢ 10¢ 10¢ 85¢ 10¢ 10¢ 10¢
Eungarian, Finishing, Upholster-
ers', &c. See Tacks.

Horse—
Nos. 6 7 8 9 10
A. C., $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
Ausable, $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
C. B. K., $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
Champion, $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
Clinton, $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
Maud's, $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
Putnam, $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
Cold Roll, $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
Vulcan, $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$ $\$2.50$
American, Nos. 5 to 10, $\$2.50$
Neponset, Nos. 5 to 10, $\$2.50$
Jobbers' special brands, per lb. $\$2.50$

Picture—
1 1/2 2 2 1/2 3 3 1/2 in.
Brass Head, $\$1.50$ $\$1.50$ $\$1.50$ $\$1.50$ $\$1.50$
Por. Head, $\$1.10$ $\$1.10$ $\$1.10$ $\$1.10$ $\$1.10$
Crown Picture Nails, $\$1.50$

Needles Tobacco—
Nagley's Tin Tobacco, $\$2.00$
Nippers, See Pliers and Nippers.

Nuts—
Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain, $\$4.50$
Hexagon, plain, $\$4.50$
Square, C. T. & R., $\$4.70$
Hexagon, C. T. & R., $\$5.00$

Hot Pressed:
Mfrs., U. S. or Nor. Gauge Stand.
Square Blank, $\$5.00$
Hexagon Blank, $\$5.00$
Square Tapped, $\$5.00$
Hexagon Tapped, $\$5.00$

Oakum—
Best or Government, $\$1.50$
Navy, $\$1.50$
U. S. Navy, $\$1.50$
Plumbers' Spun Oakum, $\$1.50$
In carload lots $\$1.50$ off f.o.b. New York.

Oil Axle—
Snow Flake:
1 pt. cans, per doz. $\$3.00$
1 qt. cans, per doz. $\$4.80$
1 gal. cans, per doz. $\$15.00$
1 gal. cans, per doz. $\$15.00$

Oil Tanks—See Tanks, Oil.
Oilers—
Brass and Copper, $\$6.50$
Tin or Steel, $\$7.00$
Zinc, $\$7.50$
Chase or Paragon:
Brass and Copper, $\$6.50$
Tin or Steel, $\$7.00$
Zinc, $\$7.50$

Malleable, Hammers' Improved, No. 1,
 $\$3.60$; No. 2, $\$4.40$; No. 3, $\$4.40$
Malleable, Hammers' Old Pattern,
same list, $\$5.00$
American Tule & Stamping Co.,
Spring Bottom Cans, $\$7.00$
Railroad Oilers etc., $\$6.00$

Openers—Can—
French, $\$2.50$
Iron Handle, $\$2.50$
Sprague, Iron Hdl., per doz. $\$3.00$
Sardine Scissors, $\$1.75$
Marvel, per doz. $\$1.25$
National, $\$1.50$
Stowell's, per doz. $\$3.45$
Tip Top, $\$3.00$

Nickel Plate, $\$2.25$
Silver Plate, $\$3.50$

Packing—
Asbestos Packing, Wick and Rope,
15¢ to $\$1.50$ lb.
Rubber—
Sheet, C. I., $\$8.00$
Sheet, C. O. S., $\$9.00$
Sheet, C. B. S., $\$10.00$
Sheet, Pure Gum, $\$10.00$
Sheet, Red, $\$10.00$
Jenkins' Standard, $\$10.00$

Miscellaneous—
American Packing, $\$1.00$
Cotton Packing, $\$1.00$
Italian Packing, $\$1.00$
Jute, $\$1.00$
Russia Packing, $\$1.00$

Pails—Creamery
S. & Co., with gauges, No. 1, $\$4.25$;
No. 2, $\$3.50$

Galvanized—
Price per doz.
Quart., $\$1.00$ $\$1.25$ $\$1.50$
Water, Regular, $\$1.75$ $\$2.00$ $\$2.25$
Water, Heavy, $\$2.75$ $\$3.00$ $\$3.25$
Fire, Rd. Bottom, $\$2.50$ $\$2.75$ $\$3.00$
Well, $\$2.25$ $\$2.50$ $\$2.75$

Pans—Dripping—
Standard List, $\$6.00$
Fry—
Common Lipped:
No. 1, $\$1.00$ $\$1.25$ $\$1.50$ $\$1.75$
Per doz. $\$9.95$ $\$1.05$ $\$1.15$ $\$1.25$
Roasting and Baking—
Resal, S. S. & Co., $\$4.50$
10 $\$5.25$; 20 $\$5.75$; 30 $\$6.25$
Simplex, $\$6.00$
No. 40 $\$5.00$ $\$5.25$ $\$5.50$ $\$5.75$
No. 27 $\$3.25$ $\$3.50$ $\$3.75$ $\$4.00$

Paper—Building Paper—
Adelbert, $\$1.00$
Building Felt, $\$2.50$
Mill Board, she. 1, $\$1.00$
Mill Board, roll, thicker than 1-16
inch, $\$1.00$
Mill Board, roll, 1-16 in. thick and
less, $\$1.00$

Per roll
Rosin Sized Sheathing: 500 sq. ft.
Light wt., 25 lbs. to roll, $\$0.35$
Medium wt., 30 lbs. to roll, $\$0.45$
Heavy wt., 40 lbs. to roll, $\$0.50$
Medium Grades Water Proof
Sheathing, $\$0.65$
Deafening Felt, 9, 6 and $\frac{1}{2}$ sq. ft.
to lb., ton, $\$5.00$
Red Rope Roofing, 250 sq. feet per
roll, $\$1.65$
NOTE—These goods are often sold at
delivered prices.

Tarred Paper.
1 ply (roll 300 sq. ft.), $\$2.00$
2 ply, roll 108 sq. ft., $\$2.50$
3 ply, roll 108 sq. ft., $\$2.50$
Slater's Felt (roll 500 sq. ft.), $\$7.00$
NOTE—Above prices often include de-
livery.

R. R. M. Stone Surfaced Roofing (roll
110 sq. ft.), $\$2.75$

Sand and Emery—
List Dec. 23, 1899. $\$6.00$ to $\$10.00$

Parers—Apple—
Advance, $\$1.50$
Baldwin, $\$1.50$
Bonanza Improved, $\$1.50$
Dandy, $\$1.50$
Eureka Improved, $\$1.50$
Family Bay State, $\$1.50$
Hudson's Little Star, $\$1.50$
Hudson's Rocking Table, $\$1.50$
Improved Bay State, $\$1.50$
New Lightning, $\$1.50$
Reading 72, $\$1.50$
Reading 78, $\$1.50$
Turn Table, $\$1.50$
White Mountain, $\$1.50$

Potato—
Saratoga, $\$7.00$
White Mountain, $\$7.00$

Paris Green—
Less than 1 ton, per lb.
Arsenic kegs or casks, $\$12.50$
Kegs, 100 to 175 lbs., $\$13.00$
Kits, 14, 25, 50 lbs., $\$14.00$
Paper boxes, 2 to 5 lbs., $\$14.00$
Paper boxes, 1 lb., $\$14.00$
Paper boxes, $\frac{1}{2}$ lb., $\$14.00$
Paper boxes, $\frac{1}{4}$ lb., $\$14.00$
1 to 5 tons, 1 cent per lb. less 5 tons
and over, $\frac{1}{2}$ cents per lb. less.

Picks and Mattocks—
List Feb. 23, 1899. $\$7.00$ to $\$10.00$

Pigeons—Clay
Mark's Black Birds, f.o.b. factory,
per M., $\$3.75$
See also Traps, Target.

Pinking Irons—
See Irons, Pinking.

Pins—Escutcheon—
Brass, $\$6.00$
Iron, list Nov. 11, '95, $\$6.00$

Pipe, Cast Iron Soil—
Standard, 2-6 in., $\$5.00$
Extra Heavy, 2-6 in., $\$6.50$
Fittings, $\$7.00$

Pipe Merchant, Boiler
Tubes, &c.—
Carload Lots, Galva-
nized.
Merchant Pipe, Black, $\$5.00$
 $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$ inch, $\$5.00$
 $\frac{1}{2}$ inch, $\$5.00$
 $\frac{1}{2}$ to 6 inch, $\$5.00$
 $\frac{1}{2}$ to 13 inch, $\$5.00$
Less than carloads, $\frac{1}{2}$ advance.

Pipe Sewer—
Jobbers' Prices—
Standard Pipe and Fittings, 2 to 24 in.
New England, $\$7.00$
New York and New Jersey, $\$7.50$
Maryland, Delaware, East Penn., $\$7.50$
West Penn. and West Va., $\$7.50$
Virginia, $\$7.50$
Ohio, Michigan and Ky., $\$7.50$
Carload lots are generally delivered.

Planes and Plane Irons—
Wood Planes—
Bench, First quality, $\$1.50$ to $\$1.50$
Bench, Second qual., $\$1.00$ to $\$1.00$
Molding, $\$1.00$ to $\$1.00$
Bailey's (Stanley R. & L. Co.)
 $\$1.00$ to $\$1.00$

Chapin-Stephens Co.:—
Bench Common (Parce), $\$1.00$ to $\$1.00$
Bench Extra and Premium,
 $\$1.00$ to $\$1.00$

Molding, $\$1.00$
Gage Self Setting, $\$1.00$
Union, $\$1.00$

Iron Planes—
Bailey's (Stanley R. & L. Co.) $\$1.00$
Chaplin's Iron Planes, $\$1.00$
Miscellaneous Planes (Stanley R. & L.
Co.), $\$1.00$ to $\$1.00$
Sargent's, $\$1.00$
Union, $\$1.00$

Plane Irons—
Wood Bench Plane Irons,
 $\$1.00$ to $\$1.00$
Buck Bros., $\$1.00$
Chapin-Stephens Co., $\$1.00$
Stanley R. & L. Co., $\$1.00$
L. & J. White, $\$1.00$

Planters, Corn, Hand.
Kohler's Eclipse, $\$2.00$

Plates—
Felloe, $\$1.50$
Self-Sealing Pie Plates (S. S. & Co.),
doz. $\$2.00$

Pliers and Nippers—
Button Pliers, $\$1.50$
Gas Burner, per doz., 5 in., $\$1.15$
 $\$1.20$; 6 in., $\$1.35$ to $\$1.45$
Gas Pipe, 7 8 10 12 in.
 $\$1.75$ $\$2.00$ $\$2.75$ $\$3.75$
Aeme Nippers, $\$5.00$
Bernard's, $\$5.00$
Paralel Pliers, $\$5.00$
Paragon Pliers, $\$5.00$
Lodi Pliers, $\$5.00$
Elm City Fence Pliers, $\$5.00$

Cronk & Carrier M. G. Co.:—
American Butto, $\$7.50$
Cronk's, $\$7.50$
Improved Butto, $\$7.50$
Stub's Pattern, $\$7.50$
Combination and others, $\$7.50$
Heller's Farriers' Nippers, Pincers,
and Tools $\$4.00$ to $\$4.00$
P. S. & W. Tinnars' Cutting Nippers,
Swedish Side, End and Diagonal Cut-
ting Pliers, $\$3.00$
Ulrich Drop Forge & Tool Co.:
Pliers and Nippers, all kinds, $\$4.00$

Plumbs and Levels—
Plumbs and Levels, $\$7.50$ to $\$7.50$
Chapin-Stephens Co.:
Pocket Levels, $\$4.00$ to $\$4.00$
Plumbs and Levels, $\$4.00$ to $\$4.00$
Danson's Plumbs and Levels, $\$7.00$
Danson's Pocket Levels, $\$7.00$
C. E. Jennings & Co.'s Iron,
C. E. Jennings & Co.'s Iron, Adjustable,
 $\$3.00$ to $\$3.00$

Stanley R. & L. Co. $\$4.00$
Stanley's Duplex, $\$2.00$
Woods' Extension, $\$3.00$

Poachers, Egg—
Buffalo Steam Egg Poachers, $\$2.00$
No. 1, $\$2.00$; No. 2, $\$2.00$; No. 3,
 $\$2.00$; No. 4, $\$2.00$

Points, Glaziers—
Bulk and 1 lb. papers, $\$1.50$
 $\frac{1}{2}$ lb. papers, $\$1.50$
 $\frac{1}{4}$ lb. papers, $\$1.50$

Pokes, Animal—
Ft. Madison Hawkeye, $\$3.25$
Ft. Madison Western, $\$3.00$

Police Goods—
Manufacturers' Lists, $\$2.50$ to $\$2.50$

Polish—Metal—
Burnishine Liquid, $\$1.00$
1 pt., $\$2.00$; 1 qt., $\$1.00$
Burnishine Paste, $\$1.00$
1 lb., $\$2.00$; 1 lb., $\$2.00$
Prestoline Liquid, No. 1 ($\frac{1}{2}$ pt.), $\$1.00$
 $\$3.00$; No. 2 ($\frac{1}{2}$ qt.), $\$0.75$
Prestoline Paste, $\$1.00$
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, $\$1.00$
doz. $\$5.00$; $\frac{1}{2}$ lb. boxes, $\$1.00$
doz. $\$1.25$; 1 lb. boxes, $\$1.25$
U. S. Liquid, 8 oz. cans, $\$1.25$
 $\frac{1}{2}$ lb. cans, $\$1.25$
Barkkeepers' Friend Metal Polish, $\$1.00$
 $\$1.75$; $\frac{1}{2}$ lb. cans, $\$1.00$
Wynn's White Silk, $\frac{1}{2}$ pt. cans, $\$2.00$

Stove—
Black Eagle Benzine Paste, 5 lb. cans, $\$1.00$
Black Eagle, Liquid, $\frac{1}{2}$ pt. cans, $\$1.00$
Black Jack Paste, $\frac{1}{2}$ lb. cans, $\$1.00$
Ladd's Black Beauty, $\$1.00$
Joseph Dixon's, $\$1.00$
Dixon's Plumbago, $\$1.00$
Fireclay, $\$1.00$
Gem, $\$1.00$
Japanese, $\$1.00$
Jet Black, $\$1.00$
Peerless Iron Enamel, $\frac{1}{2}$ pt. cans, $\$1.00$
doz. $\$1.50$

Wynn's:
Black Silk, 5 lb. pail, each $\$7.00$
Black Silk, $\frac{1}{2}$ lb. box, $\$1.00$
Black Silk, 5 oz. box, $\$1.00$
Black Silk, $\frac{1}{2}$ pt. liq., $\$1.00$

Window and Glass Cleaner.
The Glasbrite Company:
No. 1, 10-cent size, case of 2 doz., $\$1.70$
No. 3, 25-cent size, case of 1 doz., $\$2.00$
Mfrs' size, 1-lb. cakes, each, $\$3.35$
Mfrs' size, 1-lb. cakes, per doz., $\$3.00$

Poppers, Corn—
1 qt., Square, $\$9.00$
1 qt., Round, $\$10.00$
 $\frac{1}{2}$ qt., Square, $\$11.00$
 $\frac{1}{2}$ qt., Square, $\$11.00$

Sliding Shutter—
Reading list.....70¢10¢75¢
R. & E. list.....33¢15¢
Sargent's list.....50¢10¢

Shells— Shells, Empty—
Brass Shells, Empty:
First quality, all gauges.....00¢5¢
Climax, Club, Rival, 10 and 12 gauge.....65¢5¢

Paper Shell, Empty:
Acme, Ideal, Leader, New Rapid,
Magic, 10, 12, 16 and 20 gauge.....25¢5¢
Blue Rival, New Climax, Challenge,
Monarch, D. D. Rival, New Victor, 10,
12 and 20 gauge.....30¢
Climax, Union, League, New Rival
10 and 12 gauge.....25¢
Climax, Union, League, New Rival,
14, 16 and 20 gauge (\$7.50 list).....30¢
Expert, Metal Lined and Pigeon, 10,
12, 16 and 20 gauge.....33¢5¢

Shells, Loaded—
Loaded with Black Powder.....40¢
Loaded with Smokeless Powder,
medium grade.....40¢5¢
Loaded with Smokeless Powder,
high grade.....40¢10¢10¢

Shoes Horse, Mule, &c.—
F. o. b., Pittsburg:
Iron.....per keg \$5.85
Steel.....per keg 3.60
Burden's, all sizes, per keg.....\$3.90

Shot—
Drop, up to B, 25-lb. bag.....\$1.55
Drop, B and larger, per 25-lb. bag.....\$1.00
Buck, 25-lb. bag.....\$1.00
Chilled, 25-lb. bag.....\$1.00
Dust Shot, 25-lb. bag.....\$2.10

Shovels and Spades—
Association List, Nov. 15, 1902.....40¢

Sieves and Sifters—
Hunter's Imitation, gro. \$11.00@11.50
Buffalo Metallic Blue, S. & Co., per gr.:
14 lb. 10¢15¢
18 lb. 15¢20¢
24 lb. 20¢25¢
National Mfg. Co.:
Victor.....per gro. \$12.00
Surprise.....per gro. \$11.00
No Name.....per gro. \$11.00
Shaker (Barber's Pat.) Flour Sifters,
per doz., \$2.00.....90¢

Sieves, Tin Rim—
Per dozen:
Mesh.....14 16 18 20
Black, full size.....\$1.20 1.25 1.30 1.35
Plated, full size.....\$1.30 1.35 1.40 1.45
Black, scant.....\$0.95 1.00 1.05

Sieves, Wooden Rim—
Nested, 10, 11 and 12 inch.
Mesh 15, Nested, doz.....\$0.65@0.75
Mesh 20, Nested, doz.....75¢ 85¢
Mesh 24, Nested, doz.....90¢1.00

Sinks—
Cast Iron—
Standard list.....60¢60¢10¢
NOTE.—There is not entire uniformity
in use by jobbers.

Skens Wagon—
Cast Iron.....70¢70¢10¢
Malleable Iron.....40¢10¢50¢
Steel.....40¢40¢10¢

Slates, School—
Factory Shipments.
"D" Slates.....45¢
Noiseless Slates.....60¢10¢5¢
Wire Bound.....40¢

Slaw Cutters—See Cutters.
Slicers, Vegetable—
Sterling No. 10, \$2.00.....33¢

Snap, Harness—
German.....40¢40¢10¢
Covert Mfg. Co.:
Deroy.....30¢5¢2¢
High Grade.....45¢
Jockey.....30¢10¢
Trojan.....45¢
Yankee.....30¢5¢2¢
Yankee, Roller.....30¢5¢2¢

Covert's Saddlery Works:
Crown.....60¢
German.....60¢
Model.....60¢
Triumph.....60¢
W. & E. T. Fitch Co.:
Bristol.....40¢10¢
Empire.....60¢5¢
German.....40¢
National.....60¢5¢
Perfect.....45¢
Clipper.....60¢5¢
Champion.....40¢
Security.....40¢
Victor.....60¢5¢
Onella's Community:
Solid Steel.....60¢5¢
Solid Steel.....60¢
Sargent's Patent Guarded.....60¢10¢

Snaths—
Scythe.....50¢50¢1¢

Snips, Tanners'—See Shears.
Spoons and Forks—
Silver Plated—
Good Quality.....50¢10¢40¢10¢5¢
Cheap.....40¢40¢10¢
International Silver Co.,
1847 Rogers Bros. and Rogers & Han. J.,
100.....40¢10¢
Rogers & Bro., William Rogers Eagle
Brand.....30¢10¢
Anchor Rogers Brand.....60¢
Wm. Rogers & Son.....60¢10¢
Simeon L. & Geo. J. Rogers Co.:
Silver Plated Flat Ware.....60¢
No. 77 Silver Plated Ware.....60¢10¢

Miscellaneous—
German Silver.....60¢60¢10¢
Cataraugus Cutlery Co.:
Yukon Silver.....50¢
Simeon L. & Geo. J. Rogers Co.:
German or Nickel Silver, Special list
L. & 10¢

Tinned Iron—
Teas.....per gro. 45¢5¢
Tables.....per gro. 90¢@1.00

Springs— Door—
Gem (Coll).....20¢
Star (Coll).....30¢
Torrer's Rod, 3/8 in.....per doz. \$1.10
Victor (Coll).....50¢10¢10¢

Carriage, Wagon, &c.
1/4 in. and wider:
Black or 1/2 Bright, lb.....54¢
Bright, lb.....54¢
Painted Seat Springs:
1 1/2 x 2 1/2 per pr.....50¢55¢
1 1/2 x 2 x 2 1/2 per pr.....60¢55¢
1 1/2 x 3 x 2 1/2 and narrower, per pr.....80¢55¢

Cliff's Springs:
Bolster.....40¢
Seat.....per pair, 50¢
Pole, per pair, 1/2 in. \$1.10; 3/4 in. \$1.25

Sprinklers, Lawn—
Enterprise.....25¢30¢
Macksey.....per doz. \$1.80
Philadelphia No. 1, per doz. \$12; No. 2,
\$15; No. 3, \$24.....30¢

Squares—
Nickel plated.....List Jan. 5, 1900.
Steel and Iron.....70¢10¢
Rosewood Hdl Try Squares and T-
Bevels.....60¢10¢10¢70¢
Iron Hdl. Try Squares and T-Bevels,
40¢10¢40¢10¢
Dianston's Try Sq. and T-Bevels.....70¢
Winterbottom's Try and Miter.....40¢10¢40¢10¢10¢

Squeezers— Lemon—
Wood, Common, gro. No. 0, \$5.25
@5.50; No. 1, \$6.35@5.50.
Wood, Porcelain Lined.
Cheap.....doz. \$2.00@2.75
Good Grade.....doz. \$3.00@3.50
Tinned Iron.....doz. \$0.75@1.25
Iron, Porcelain Lined doz. \$2.30@3.25

Staples—
Barbed Blind.....lb. 6¢@4¢
Electricians', Association list.....80¢10¢10¢10¢
Fence Staples, See Trade Report.
Galvanized, 10¢ less than Barb Wire
Polished, 20¢ less than Barb Wire.
Poultry Netting, Staples.....per lb. 2 1/4¢@2 1/2¢
Grand Crossing Tack Co.'s list.....80¢10¢

Steels, Butchers'—
Dick's.....30¢
Foster Bros.....30¢
Hartzell Cutlery Co.....30¢5¢
C. & A. Hoffmann's.....40¢

Steeleyards—
25¢10¢30¢10¢

Stocks and Dies—
Blacksmiths'.....40¢10¢50¢
Curtis Reversible Batchet Die Stock, 25¢
Derby Screw Plates.....25¢
Gardner Die Stocks No. 1.....50¢
Gardner Die Stocks, larger sizes.....40¢
Green River.....25¢
Lightning Screw Plate.....25¢
Little Giant.....25¢
Reece's New Screw Plates.....25¢30¢

Stone—
Scythe Stones—
Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 inch, \$3.00 per
gro. 12 inch, \$10.3
Pike Mfg. Co. 1901 list:
Black Diamond S. S.....per gro. \$12.00
Lamotte S. S.....per gro. \$11.00
White Mountain S. S.....per gro. \$9.00
Green Mountain S. S.....per gro. \$8.00
Extra Indian Pond S. S.....per gro. \$7.30
No. 1 Indian Pond S. S.....per gro. \$7.00
No. 2 Indian Pond S. S.....per gro. \$4.50
Leader Red End S. S.....per gro. \$4.50
Balance of 1901 list 33¢1/2

Oil Stones, &c.
Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit.....30¢
Gem Corundum Oil, Single or Double
Grit.....35¢
Gem Corundum Slips.....25¢
Gem Corundum Razor Hones.....50¢
Pike Mfg. Co. 1901 list:
Arkansas Stone, No. 1, 3 to 5 in. \$2.50
Arkansas Stone, No. 1, 5 to 8 in. \$3.50
Arkansas Stone, No. 1, 8 to 10 in. \$4.00
Lily White Washita 4 to 8 in.....60¢
Rosy Red Washita 4 to 8 in.....60¢
Washita Stone, Extra, 4 to 8 in.....50¢
Washita Stone, No. 1, 4 to 8 in.....40¢
Washita Stone, No. 2, 4 to 8 in.....30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
India Oil Stones (entire list).....25¢
Hindustan No. 1, Regular.....per doz. \$1.50
Hindustan No. 1, Small.....per doz. \$1.00
Axe stones (all kinds).....35¢
Turkey Oil Stones, ex. 3 to 10 in. \$8.00
Queer Creek Stones, 4 to 8 in.....30¢
Queer Creek Slips.....40¢
Sand Stone.....50¢
Belgian, German and Swaty Razor
Hones.....40¢
Natural Grit Carving Knife Hones,
per doz.....50¢
Quick Edge Pocket Knife Hones,
per doz.....\$2.00
Mounted Kitchen Sand Stone,
doz.....\$1.50

Stoners— Cherry—
Enterprise.....25¢30¢

Stops Bench—
Miller's Falls.....15¢10¢
Morrill's.....per doz. \$1.10, \$1.00
Morrill's, No. 2, \$1.25.....50¢

Plane—
Chapin-Stephens Co.....20¢25¢

Strap—
Rox—
Carry's Universal, case lots.....30¢10¢

Hame—
Covert's Saddlery Works.....60¢10¢

Stretchers, Carpet—
Cast Iron, Steel Points.....doz. 55¢60¢
Socket.....doz. \$1.75

Stuffers Sausage—
Enterprise Mfg. Co.....25¢25¢7¢
National Specialty Mfg. Co., list Jan.
1, '97.....30¢

Supports, Porch—
Hoffman's Porch Supports.....doz. 25¢

Sweepers, Carpet—
National Sweeper Co.:
Marjory, Roller Bearing, regular
finishes, full Nickel.....\$24.00
Marion Queen, Roller Bearing,
Fancy Veneers, full Nickel.....\$27.00
Monarch, Roller Bearing, Nickel.....\$22.00
Monarch, Roller Bearing, Jap'ned.....\$24.00
Marion Queen, Roller Bearing, Reg-
ular Finishes, full Nickel.....\$24.00
Transparent, Roller Bearing, Plate
Glass Top, Nickel.....\$32.00
Monarch Extra, Roller Bearing,
(17-inch case), Nickel.....\$36.00
Monarch Extra, Roller Bearing (17-
inch case), Japanese.....\$33.00
Perpetual, Regular Bearings, Nickel \$30.00
Perpetual, Regular Bearings, Jap. \$14.00
NOTE.—Discount of 30¢ per dozen on
three-dozen lots. Discount of \$1 per
dozen on five-dozen lots.

Tacks Brads, &c.—
List Jan. 15, '99.
Carpet Tacks, American.....90¢25¢5¢
American Cut Tacks.....90¢25¢5¢
Swedes Iron Tacks.....90¢25¢5¢
Swedes Upholsterers' Tacks.....90¢25¢5¢
Gimp Tacks.....90¢25¢5¢
Lace Tacks.....90¢25¢5¢
Trimmers' Tacks.....90¢25¢5¢
Looking Glass Tacks.....70¢10¢
Bill Posters' and Railroad Tack.....90¢25¢5¢
Hungarian Nails.....80¢25¢5¢
Common and Patent Brads.....80¢10¢
Trunk and Clout Nails.....80¢5¢
Queen City S. S. & Co., 35 gal.....\$3.65
Queen City S. S. & Co., 60 gal.....\$4.50

Tapes, Measuring—
American Asses' Skin.....40¢10¢30¢
Patent Leather.....25¢30¢5¢
Steel.....40¢10¢5¢
Chesterman's.....25¢25¢5¢
Eddy's Steel.....40¢10¢5¢
Eddy's Metallic.....33¢1/2¢33¢1/2¢
Keuffel & Esser Co., Steel and Metallic,
Lower list, 1899.....35¢
Lufkin's Steel.....33¢1/2¢35¢
Lufkin's Metallic.....30¢30¢5¢

Teeth, Harrow—
Steel Harrow Teeth, plain or headed,
1/2 inch and larger, per 100 lbs. \$2.35¢

Thermometers—
Tin Case.....30¢10¢30¢10¢5¢

Ties, Bale—Steel Wire.
Single Loop.....80¢80¢10¢
Improved, Monitor, Cross Head,
Etc.....70¢

Ties, Wall—
Cleveland Wire Spring Co.:
Galv. Steel 5-32 x 8 1/2 in. \$1.00, \$1.00
Galv. Steel 5-32 x 8 1/2 in. \$1.00, \$1.00
Galv. Steel 5-32 x 11 1/2 in. \$1.00, \$1.00
Galv. Steel 5-32 x 15 1/2 in. \$1.00, \$1.00

Tinners' Shears, &c.—
See Shears, Tinners', &c.

Tinware—
Stamped, Japanned and Placed, sold
very generally at net prices.

Tips, Safety Pole—
Covert's Saddlery Works.....60¢10¢

Tire Benders, Upsetters, &c.—
See Benders and Upset-
ters, Tire.

Tools—Coopers'—
L. & L. J. White.....20¢20¢5¢
Saw—
Atkins' Cross Cut Saw Tools.....40¢
Simonds' Improved.....33¢1/2¢
Simonds' Crescent.....25¢

Ship—
L. & L. J. White.....25¢

Transom Lifters—
See Lifters, Transom.

Traps—Fly—
Balloon, Globe or Acme.....doz. \$1.15@1.25; gro. \$11.50@12.00
Harper, Champion or Paragon
doz. \$1.25@1.40; gro. \$13.00@13.50

Game—
Oneida Pattern.....80¢80¢5¢
Newhouse.....45¢45¢5¢
Hawley & Norton.....65¢5¢65¢10¢
Victor (Oneida Pattern).....75¢75¢5¢
Star (Blake Pattern).....60¢5¢60¢10¢

Mouse and Rat—
Mouse, Wood, Choker, doz. holes.....8 1/2¢9¢
Mouse, Round or Square Wire.....doz. 85¢90¢
Eli Rat Traps.....per doz. 40¢
Marty French Rat and Mouse Traps
(Genuine), No. 1, Rat, Each \$1.12 1/2; per doz. \$1.20

No. 3, Rat, per doz. \$6.00; case of 50
\$5.25 doz.
No. 3 1/2, Rat, per doz. \$4.75; case of 72
\$4.25 doz.

No. 4, Mouse, per doz. \$3.50; case of 7
\$2.75 doz.
No. 5, Mouse, per doz. \$2.75; case of 150
\$2.25

Schuyler's Rat Killer, No. 1, per gr. \$30.00
No. 2, per gr. \$30.00; Mouse, No. 3,
\$15.00
J. M. Mast Mfg. Co.:
Mouse, Rat
Blizzard.....No. 12, \$3.00 No. 1, \$9.50
Old Nick.....No. 30, 2.22 No. 2, 8.40
Joker.....No. 5, 2.10 No. 3, 8.40
Imp'd Snap Shot, Mouse, per gro., 4
hole, \$4.20

Target—
Markle's, each.....\$5.70

Trimmers Spoke—
Bonney's Nos. 1 and 2.....40¢
Wood's E. I.....50¢

Trowels—
Disston Brick and Pointing.....30¢
Disston Plastering.....25¢
Disston "Standard Brand" and Gar-
den Trowels.....35¢
Never-Break Steel Garden Trowels.....gro. \$6.00
Peace's Plastering.....30¢
Rose Brick and Plastering.....25¢5¢
Woodrough & McParlin, Plastering.....25¢

Trucks, Warehouse, &c.—
B. & L. Block Co.:
New York Pattern.....50¢10¢
Western Pattern.....60¢10¢
Handy Trucks.....per doz. \$15.00
Grocery.....per doz. \$15.00
Daisy Stove Trucks, Improved pattern
per doz. \$18.50
Model Stove Trucks.....per doz. \$18.50

Tubs, Wash—
No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Galvanized, per doz. \$4.75 \$5.25 6.00
Galvanized Wash tubs (S. S. & Co.):
No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Per doz. \$5.25 6.00 6.75 6.50 7.00 7.00

Twine—Miscellaneous—
Flax Twine.....BC B.
No. 9, 1/4 and 1/2 lb. Balls 21¢ 23¢
No. 12, 1/4 and 1/2 lb. Balls 17¢ 19¢
No. 18, 1/4 and 1/2 lb. Balls 15¢ 17¢
No. 24, 1/4 and 1/2 lb. Balls 15¢ 17¢
No. 36, 1/4 and 1/2 lb. Balls 15¢ 17¢
Chalk Line, Cotton, 1/2-lb. Balls.....25¢22¢1¢

Cotton Mops, 6, 9, 12 and 15 lb. to
doz.....80¢
Cotton Wrapping 5 Balls to lb.
according to quality.....11¢@17¢
American 2-Ply Hemp, 1/4 and 1/2 lb.
Balls.....15¢10¢
American 3-Ply Hemp, 1-lb. Balls.....15¢10¢

India 2-Ply Hemp, 1/4 and 1/2 lb.
Balls (Spring Twine).....80¢
India 3-Ply Hemp, 1-lb. Balls.....70¢
India 3-Ply Hemp, 1/4-lb. Balls.....80¢
2, 3, 4 and 5-Ply Jute, 1/2-lb. Balls.....80¢

Mason Line, Linen, 1/2-lb. Balls.....150¢
No. 26 Mattress, 1/4 and 1/2 lb. Balls 37¢
Wool, 3 to 6 ply.....50¢55¢

Vises—
Solid Box.....50¢50¢10¢

Parallel—
Athol Machine Co.:
Simpson's Adjustable.....40¢
Standard.....40¢
Amateur.....25¢
Bonney's.....40¢
Columbian Hdw. Co.....40¢
Emmert Universal:
Pattern Makers' No. 1.....\$15.00 net
Pattern Makers' No. 2.....\$13.00 net
Machinist and Tool Makers'.....\$15.00 net
Fisher & Norris Double Screw.....15¢10¢
Rollands:
Machinists'.....40¢
Keystone.....65¢5¢
Lewis Tool Co.....20¢30¢
Massey's Perfect.....15¢20¢
Massey's:
Climber.....80¢40¢
Combination, Quick Adj.....15¢
Woodworker's.....20¢
Merrill's.....50¢10¢10¢
Miller's Falls.....50¢10¢10¢
Parker's:
Victor.....20¢25¢
Regulars.....20¢25¢
Vulcan.....40¢45¢
Combination Pipe.....55¢40¢
Prentiss.....20¢25¢
Sargent's.....40¢
Smith & Hemenway Co.:
Machinists.....40¢
Jewellers.....35¢
Snedeker's X. L.....33¢
Stephens'.....33¢

Saw Filers—
Bonney's No. 1, \$13; No. 3, \$16 1/2, 50¢5¢
Disston's D S Clamp and Guide, per doz
\$30.....25¢
Reading.....60¢
Wentworth's Rubber Jaw, Nos. 1, 2
and 3.....45¢50¢

Wood Workers—
Wyman & Gordon's Quick Action, 6
in., \$8.00; 9 in., \$7.00; 14 in., \$8.00.

Miscellaneous—
Signal & Keeler Combination Pipe
Vise
Parker's Combination Pipe.....60¢
Parker's Series.....60¢
187 Series.....60¢5¢
No. 870.....60¢5¢

Wads—Price Per M.
B. E., 11 up.....60¢
B. E., 9 and 10.....70¢
B. E., 8.....80¢
B. E., 7.....80¢
P. E., 11 up.....\$1.00
P. E., 9 and 10.....1.25
P. E., 8.....1.50
P. E., 7.....1.50
Ely's B. E., 11 and larger.....\$1.70@1.75
Ely's P. E., 12 to 20.....\$3.00@3.25

Ware Hollow—**Cast Iron, Hollow—**

Stove Hollow Ware:	
Ground.....	60%
Unground.....	65%
White Enamelled Ware:	
Maslin Kettles.....	70%
Covered Ware:	
Tinned and Turned.....	40%
Enamelled.....	60%
See also Pots Blue.	

Enamelled—

Agate Nickel Steel Ware, list Nov. 1,	
01.....	50% 50%
Iron Clad Ware.....	70% 10%
LAVA, Enamelled.....	40% 10%
Never Break Enamelled.....	50%

Tea Kettles—

Galvanized Tea Kettles:	
Each.....	6 7 8 9
Each.....	50c 50c 50c 50c

Steel Hollow Ware.

Avery Spiders & Griddles.....	65% 65% 5%
Avery Kettles.....	60%
Porcelain.....	50% 50% 50% 10%
Never Break Spiders and Griddles.....	60% 5%

Never Break Kettles.....	60%
Solid Steel Spiders & Griddles.....	65% 5%
Solid Steel Kettles.....	60%

Warmers, Foot—

Pike Mfg. Co., Soapstone.....	40% 40% 10%
-------------------------------	-------------

Washboards—

Solid Zinc:	
Crescent, family size, bent frame.....	\$3.00
Red Star, family size, stationary	
protector.....	\$3.00
Double Zinc Surface:	
Bagnaw Globe, family size, station-	
ary protector.....	\$2.85
Cable Cross, family size, stationary	
protector.....	\$2.90

Single Zinc Surface:	
Salad, family size, open back perfo-	
rated.....	\$2.40
Bagnaw Jobs, protector, family	
size, ventilated back.....	\$2.35
Brass Surface:	
Brass King, Single Surface, open	
back.....	\$3.00
Nickel Plate Surface:	
No. 1001 Nickel Plate, Single Surface	
.....	\$3.00

Washers—**Leather, Axle—**

Solid.....	85¢ 10¢ 10¢ 85¢ 10¢ 1¢ 1¢
Patent.....	85¢ 10¢ 85¢ 20%
Coil: 1/2 1 1 1/2 1 1/2 1 1/2	
10 10 10 10 10 10 10	

Iron or Steel—

Size bolt 5-16 3/4 1/2 3/4 3/4	
Washers.....	\$1.00 5-10 4-10 4-20 4-30
In lots less than one keg add 1/2¢ per	
lb., 5-lb. boxes add 1/4¢ to list.	

Cast Washers—

Over 1/2 inch, barrel lots, per lb.....	1 1/2¢ 1 1/2¢
---	---------------

Wedges—

Oil Finish.....	10¢ 2.90 3.10¢
-----------------	----------------

Weights—

Covert's Saddlery Works.....	60% 10%
Sash.....	

Hitching—

Eastern District.....	\$25.00
Western, Central and Southern	
Districts.....	\$25.00

Wheels, Well—

8-in., \$1.50 10-in., \$2.00 12-in., \$2.50	
12-in., \$2.50 14-in., \$3.00 16-in., \$3.50	

Wire and Wire Goods—

Bright and Annealed:	
6 to 9.....	7 1/2¢ 5¢ 7 1/2¢ 10%
10 to 18.....	7 1/2¢ 5¢ 7 1/2¢ 10%

19 to 26.....	7 1/2¢ 5¢ 7 1/2¢ 10%
27 to 36.....	7 1/2¢ 5¢ 7 1/2¢ 10%
Galvanized:	
6 to 18.....	70¢ 70¢ 5%
19 to 26.....	7 1/2¢ 5¢ 7 1/2¢ 10%
27 to 36.....	7 1/2¢ 5¢ 7 1/2¢ 10%

Coppered:

6 to 9.....	70¢ 5¢ 70¢ 10%
10 to 18.....	70¢ 5¢ 70¢ 10%
19 to 26.....	7 1/2¢ 5¢ 7 1/2¢ 10%
27 to 36.....	7 1/2¢ 5¢ 7 1/2¢ 10%

Tinned:

6 to 14.....	75¢ 75¢ 7 1/2%
15 to 18.....	7 1/2¢ 7 1/2¢ 7 1/2%
19 to 26.....	70¢ 5¢ 70¢ 10%
27 to 36.....	70¢ 5¢ 70¢ 10%

Annealed Wire on Spools.....

Brass and Copper Wire on Spools.....	60¢ 60¢ 5%
--------------------------------------	------------

Brass, list Feb. 26, '96.....

Copper, list Feb. 26, '96.....	15%
--------------------------------	-----

Cast Steel Wire.....

Stub's Steel Wire.....	\$6.00 to \$2.40
------------------------	------------------

Wire Clothes Line, see Line.....

Wire Picture Cord, see Cord.....	
----------------------------------	--

Bright Wire Goods—

List April 1, 1901.....	85¢ 10¢ 10¢ 90%
-------------------------	-----------------

Wire Cloth and Netting—

Galvanized Wire Netting.....	10¢ 10¢ 10¢ 15%
------------------------------	-----------------

Painted Screen Cloth per 100 ft.....

Light Hardware Grade:	
2-8 Mesh, Plain (sc. list) sq. ft.....	14¢ 14¢

2-8 Mesh, Galv. (sc. list) sq. ft.....

Wire, Barb—See Trade Report.....	
----------------------------------	--

Wrenches—

Agricultural.....	75¢ 5¢ 75¢ 10¢ 5%
Baxter Pat'n S Wrenches.....	70¢ 70¢ 5%
Dron Forged S.....	55¢ 55¢ 5%
Acme.....	60% 10%

Alligator.....	70%
Bull Dog.....	70%
Bemis & Call's:	
Adjustable S.....	35% 5%

Brigg's Pattern.....

Combination Black.....	40% 5%
Combination Bright.....	40%
Cylinder or Gas Pipe.....	55%
Extra Heavy.....	45%
Merrick's Pattern.....	50%
No. 3 Pipe, Bright.....	55%

Boardman's.....

Coe's Genuine.....	40% 10% 5% 5%
Coe's "Mechanics".....	40% 10% 5% 5%
Donohue's Engineer.....	40% 10%
Dudley Auto.....	50% 50% 10%
Eagle.....	50% 10%
Elgin Wrenches.....	40%
Elgin Monkey Wrench Pipe Jaws.....	33% 4%
Gem Pocket.....	30%
Hercules.....	70%

W. & B. Machinist.....

Case lots.....	50% 10%
Less than case lots.....	50% 5%
Improved Pipe (W & B).....	60%
Solid Handles, P.S. & W.....	50% 50% 5%
Sullivan.....	65%
Triumph.....	60% 10%
Vulcan Chain.....	50%

Fruit Jar.....

Perfection Fruit Jar Wrenches, 1/2 gro.....	85%
Triumph Fruit Jar Wrenches, 1/2 gro.....	85%
Cap Wrenches, 1/2 gro.....	24.00
Triumph Fruit Jar Holders, 1/2 doz.....	\$1.50; 1/2 gro., \$1.50.

Wrought Goods—

Staples, Hooks, etc., list March 17	
'92.....	30¢ 30¢ 5%

Yokes Neck—

Covert Saddlery Works, Trimmed.....	70%
Covert Saddlery Works, Neck Yoke	
Centers.....	70%

Yokes, Ox, and Ox Rows—

Fort Madison's Farmers & Freighters.....	list net
--	----------

Zinc—

Sheet.....	76¢ 6¢ 6%
------------	-----------

PAINTS, OILS AND COLORS—Wholesale Prices.**White Lead, Zinc, &c.**

Lead, English white, in Oil.....	6 1/2¢ 9%
Lead, American White, in Oil:	
Lots of 500 lb or over.....	6 1/2%
Lots less than 500 lb.....	6 1/2%
Lead, White, in oil, 25 lb tin	
pails, add to keg price.....	1/2%
Lead, White, in oil, 12 1/2 lb tin	
pails, add to keg price.....	1/2%
Lead, White, in oil, 1 to 5 lb as-	
sorted tins, add to keg price.....	1 1/2%
Lead White, Dry in bbls.....	5 1/2¢ 8%
Lead, American, Terms: On lots of 500	
lbs. and over, 60 days, or 2% for cash if	
paid in 15 days from date of invoice.	

Zinc, American, dry.....

Zinc, Paris, Red Seal, dry.....	4 1/2%
Zinc, Paris, Green Seal, dry.....	8%
Zinc, Antwerp, Red Seal, dry.....	9%
Zinc, Antwerp, Green Seal, dry.....	8 1/2%
Zinc, V. M. French, in Poppy Oil,	
Green Seal:	
Lots of 1 ton and over.....	12¢ 12 1/2%
Lots of less than 1 ton.....	12 1/2¢ 12 1/2%
Zinc, V. M. French, in Poppy Oil,	
Red Seal:	
Lots of 1 ton and over.....	10 1/2¢ 11 1/2%
Lots of less than 1 ton.....	11 1/2¢ 11 1/2%

DISCOUNTS.—V. M. French Zinc.—Dis-

counts to buyers of 10 bbls, lots of one or	
assorted grades, 15; 25 bbls, 25; 50	
bbls, 45.	

Dry Colors.

Black, Carbon.....	5¢ 5¢ 8
Black, Drop, Amer.....	4¢ 7
Black, Drop, Eng.....	7¢ 11
Black, Ivory.....	12¢ 21
Lamp, Com.....	4 1/2¢ 6
Blue, Celestial.....	3¢ 4 1/2
Blue, Chinese.....	30¢ 35
Blue, Prussian.....	28¢ 34
Blue, Ultramarine.....	3¢ 12
Brown, Spanish.....	1 1/2¢ 2 1/2
Brown, Vandyke, Amer.....	2 1/2¢ 3 1/2
Brown, Vandyke, Foreign.....	2 1/2¢ 3 1/2
Carmine, No. 40.....	2 1/2¢ 3 1/2
Green, Chrome, ordinary.....	3¢ 6 1/2

Green, Chrome, pure.....

Lead, Red, bbls, 1/2 bbls, and kegs:	
Lots less than 500 lb.....	6 1/2%
Lots less than 500 lb.....	6 1/2%
Lots less than 500 lb.....	6 1/2%
Lots less than 500 lb.....	6 1/2%

Ocher, French Washed.....

Ocher, Dutch Washed.....	4 1/2¢ 5
Ocher, American.....	10¢ 10¢ 13.00

Orange Mineral, English.....

Orange Mineral, French.....	10¢ 10¢ 13.00
Orange Mineral, German.....	8 1/2¢ 9 1/2
Orange Mineral, American.....	8 1/2¢ 9 1/2

Red, Indian, English.....

Red, Indian, American.....	3¢ 3 1/2
Red, Turkey, English.....	4¢ 6 1/2
Red, Tuscan, English.....	7¢ 10
Red, Venetian, Amer.....	100 lb, 10¢ 1.50
Red Venetian, English.....	100 lb, 1.80; 40¢ 4.00
Sienna, Italian, Burnt and	
Powdered.....	3 1/2¢ 7 1/2
Sienna, Ital., Raw, Powd.....	3 1/2¢ 7 1/2
Sienna, American, Raw.....	1 1/2¢ 3
Sienna, American, Burnt and	
Powdered.....	1 1/2¢ 2
Talc, French.....	100 lb \$1.25 1.50
Talc, American.....	100 lb \$1.10 1.10
Terra Alba, French.....	100 lb, 95¢ 1.00
Terra Alba, English.....	95¢ 1.00
Terra Alba, American No. 1.....	85¢ 85
Terra Alba, American No. 2.....	45¢ 45
Umber, Turkey, Bnt & Powd.....	2 1/2¢ 3 1/2
Umber, Turkey, Raw & Powd.....	2 1/2¢ 3 1/2
Umber, Bnt, Amer.....	1 1/2¢ 2
Umber, Raw, Amer.....	1 1/2¢ 2
Yellow, Chrome.....	10¢ 25
Vermilion, American Lead.....	10¢ 40
Vermilion, Quicksilver, bulk.....	60
Vermilion, Quicksilver, bags.....	71
Vermilion, English, Import.....	1.05 1.20
Vermilion, Chinese.....	\$1.05 1.20

Colors in Oil.

Black, Lampblack.....	12¢ 14
Blue, Chinese.....	36¢ 40
Blue, Prussian.....	32¢ 36
Blue, Ultramarine.....	13¢ 16

Brown, Vandyke.....

Green, Chrome.....	9 1/2¢ 13
Green, Chrome.....	10¢ 12
Sienna, Raw.....	10¢ 13
Sienna, Burnt.....	10¢ 13
Umber, Raw.....	9 1/2¢ 12
Umber, Burnt.....	9 1/2¢ 12

Miscellaneous.

Barytes, Foreign, 1/2 ton.....	\$19.00 21.00
Barytes, Amer. Roasted.....	19.00 20.00
Barytes, Crude, No. 1.....	9.00 10.00
Chalk, in bulk.....	2.00 2.60
Chalk, in bbls.....	2.00 3.50
China Clay, English.....	12.00 17.50
Cobalt, Oxide.....	100 lb 2.25 2.50
Whiting, Common.....	100 lb .40¢ .60
Whiting, Gliders.....	.45¢ .65
Whiting, extra Gliders.....	.55¢ .65

Putty.

In bladders.....	\$2.25
In bulk.....	2.25
In cans, 1 lb to 5 lb.....	3.25
In cans 12 lb to 25 lb.....	3.25

Spirits Turpentine.

In Southern bbls.....	61¢ 11 1/2
In machine bbls.....	61¢ 11 1/2

Glue.

Cabinet.....	11¢ 16
Extra White.....	18¢ 23
French.....	12¢ 40
Irish.....	13¢ 16
Low Grade.....	9¢ 12
Medium White.....	14¢ 16 1/2

Animal, Fish and Vege-

table Oils.	
Linseed, City, raw.....	7¢ 46¢ 47

Linseed, City, boiled.....

Linseed, State and West, raw.....	45¢ 47
Linseed, raw Calcutta sea.....	75¢
Lard, Prime.....	84¢ 89
Lard, Extra No. 1.....	85¢ 88
Lard, No. 2.....	82¢ 86
Cotton-seed, Crude, 10 lb tin.....	56¢
Cotton-seed, Summer Yellow,	
prime.....	41¢ 41 1/2
Cotton-seed Summer Yellow,	
off grades.....	30¢ 39 1/2
Sperm, Crude.....	66¢
Sperm, Natural Spring.....	71¢ 63
Sperm, Bleached Spring.....	74¢ 66
Sperm, Natural Winter.....	73¢ 67
Sperm, Bleached Winter.....	78¢ 69
Tallow, Prime.....	68¢ 64
Whale, Crude.....	46¢
Whale, Natural Winter.....	46¢ 47
Whale, Bleached Winter.....	48¢ 49
Menhaden, Crude, Sound.....	32¢
Menhaden, Light Strained.....	32¢ 33
Menhaden, Bleached Winter.....	34¢ 35
Menhaden, Ex Bleached Winter.....	36¢ 37
Cocoonut, Ceylon.....	61¢ 64
Cocoonut, Ceylon.....	61¢ 64
Cod, Domestic.....	33¢ 35
Cod, Newfoundland.....	36¢ 37
Red Pine.....	48¢ 49
Red Saponified.....	51¢ 54
Olve, Italian, bbls.....	53¢ 58
Neatsfoot, prime.....	57¢ 58
Palm, prime, Lagos.....	76¢ 6¢ 6%

Mineral Oils.

Black, 20 gravity, 25¢ 30 cold	
test.....	11 1/2¢ 13
Black, 20 gravity, 15¢ cold test.....	12 1/2¢ 13
Black, 20 gravity, 15¢ cold test.....	11¢ 12 1/2
Cylinder, light filtered.....	15¢ 18
Cylinder, dark filtered.....	15¢ 18
Paraffine, 63-907 gravity.....	1 1/2¢ 14
Paraffine, 901 gravity.....	1 1/2¢ 13
Paraffine, 883 gravity.....	1 1/2¢ 14
Paraffine, red, No. 1.....	1 1/2¢ 14
In small lots 1/2¢ advance.	

THE IRON AGE

